November, 1943

THE FOUNDRY

FIFTY-SECOND YEAR

TECHNOLOGY DEPT.
DETROIT

olve Your MANPOWER Problem With MODERN

upolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles •
proved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems
r Metal & Mold Handling • Furnace Charging Cranes • Electric Cranes •

MODERN EQUIPMENT COMPANY
PORT WASHINGTON, WISCONSIN

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.
DEPT. 503

OFF. U. S. NAVY PHOTO

BETTER CASTINGS FOR

War and Peace

YOU can't beat American ingenuity! Producing castings for the armaments of war—faster, better, more accurately—is the specialty of our foundries *today*. *Tomorrow*, Yankee resourcefulness will turn, with equal facility, to the products of peace.

Contributing in no small degree is PURITE—the scientific flux, which aids materially in speeding production, lowering costs and maintaining the maximum output of sound, tough gray iron and converter steel castings.

In the cupola Purite improves melting conditions and reduces sulphur pick-up . . . in the ladle it removes sulphur as required to meet specifications. In both applications Purite refines the iron . . . that means stronger, cleaner castings and fewer rejects. Write for Bulletin P-41 which describes the uses of Purite.

Purite

ARMY E NAVY

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42ND STREET, NEW YORK, N.Y.
(Licensee of Metallurgical Development Company, Inc.)

SODA ASH IN ITS MOST EFFICIENT FORM FOR METALLURGICAL PURPOSES

The women

They know that this is war, and that the price of victory will be high. They have sent off their sons, brothers and husbands to the armed forces, and they are coming out of beauty shops and offices, stores and homes, and are taking war jobs in steel mills and shipyards. The deft hands that in peacetime wielded the skillet and the dryer are now managing the boring mill and the welding torch—and to very good effect.

Ever try keeping traffic flowing smoothly in and out of the main entrance of a big steel plant? Ever knock a "hot top" off an ingot? Or rough-bore a gun forging? Or weld a ship's hull? Not women's work? Women are every day doing these and dozens of other jobs in Bethlehem shipyards and steel plants, and doing them superbly.

At Bethlehem and Lackawanna, at Baltimore, at Fore River and Hingham, on the Pacific Coast—and at other locations where this company operates plants and shipyards—former clerks and beauty-shop operators, salesgirls and housewives, are applying themselves to their new, challenging tasks with wonderful spirit and skill. They are helping to swell the mighty output of steel and ships and ordnance. The results of their efforts are being painfully felt in Tokyo and Berlin. Hats off to them!

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

Woman "patrolman" at a Bethlehem steel plant. Here is a job calling for plenty of tact and skill! Women are serving on patrol duty at gates, parking lots, offices, and other locations with efficiency and aplomb.

Once a dancer, now she runs a machine in a Bethlehem shipyard.

This "buggy" operator is hauling naval shells in a Bethlehem plant.

Upswept hairdo, red finger-nails, don't keep this girl welder from doing a man-size job at a Bethlehem shipyard.

NOW IS THE TIME TO SWITCH TO

CROWN HILL Seacoal Facing is a new and better seacoal made to do a better job in today's foundries. It is designed to help solve your production problems.

CROWN HILL Seacoal Facing is made from the best coal, pulverized on the most modern machinery, in a new plant designed exclusively for that purpose. It's as good as more than 35 years' experience can make it!

Now's the time to switch. Put Crown Hill Seacoal Facing to work in your foundry.

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • MINNEAPOLIS • NEW YORK • ST. LOUIS • RICHMOND, VA. • UPTON, W.
Mines

THE FOUNDRY

for NOVEMBER 1943

VOLUME 71 NUMBER 11

Editorial Staff

FRANK G. STEINEBACH
Editor

PAT DWYER
Engineering Editor

EDWIN BREMER
Metallurgical Editor

WILLIAM G. GUDE
Associate Editor

DON S. CADOT
Art Editor

New York . . . . . B. K. PRICE
L. E. BROWNE
Chicago . . . . . E. F. ROSS
Detroit . . . . . A. H. ALLEN
Pittsburgh . . . . . R. L. HARTFORD
Washington . . . . . L. M. LAMM
London . . . . . VINCENT DELPORT

Advisory Staff

JOHN W. BOLTON
ALBERT E. GROVER
JOHN HOWE HALL
N. K. B. PATCH
HARRY A. SCHWARTZ

Business Staff

J. M. LATHROP
Advertising Manager

New York . . . . . J. F. AHRENS
Chicago . . . . . L. C. PELOTT
G. A. POPE
Cleveland . . . . A. L. KLINGEMAN
Los Angeles . . . . . F. J. FULLER

Main Office

Penton Building, Cleveland, 13, Ohio

Branch Offices

New York, 17 . . . 110 East 42nd Street
Chicago, 11 . . 520 N. Michigan Avenue
Detroit, 2 . . . . 6560 Cass Avenue
Los Angeles, 4 . 130 N. Hampshire Avenue
Pittsburgh, 19 . . . . Koppers Building
Washington, 4 . . National Press Building
London . . . . . 2, Caxton Street
Westminster, S.W. 1.

THE FOUNDRY is published monthly by THE PENTON PUBLISHING CO., Penton Building, 1213 West Third Street, Cleveland, O. EARL L. SHANER, President and Treasurer; GEORGE O. HAYS, Vice President and FRANK G. STEINEBACH, Secretary.

Subscription: In the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $2.00; three years, $5.00. Single copies 25 cents. Copies published three months or more previous to date of current issue, 50 cents.

Member: Audit Bureau of Circulations, Associated Business Papers, National Publisher's Association.

Copyright 1943 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland under the act of March 3, 1879.

	Page
Editorial	105
Casting Nonferrous Parts for Ordnance By PAT DWYER	106
Modern Methods in Casting Magnesium By F. A. FOXALL	110
Gray Iron Founders Study War and Postwar Problems	112
New Steel Foundry Makes Navy Castings By PAT DWYER	114
Electric Steel Making Conference Attracts Interest	118
Snagging Castings By G. S. EISAMAN	119
Brass and Bronze Castings Conservation Chart Revised	121
Study Malleable Castings for Military Applications By O. W. SIMMONS, P. C. ROSENTHAL and C. H. LORIG	122
Ladle Inoculation Improves Gray Iron Properties By HAROLD W. LOWNIE JR.	126
Among Detroit Foundries By A. H. ALLEN	144
The Adventures of Bill By PAT DWYER	148
Hydraulic Drive Spins Steel Casting Machines By EDWIN BREMER	154
Savings To Be Effected in Cupola Melting By JOHN LOWE	158

Questions and Answers	128	Foundry Group Meetings	177
Men of Industry	134	With the Editor	182
Foundry Developments	140	Washington Notes	186
Obituary	152	Readers' Comment	189
Equipment and Supplies	162	Where-to-Buy Directory	210
Foundry Activities	168	Index to Advertisers	246

WESTRUSH

A. W. KNUTSON
Foundry Superintendent

JOSHUA HENDY IRON WORKS
Sunnyvale, California

he says:

"We have been successfully using Linoil for several years and have always found it to be of great value. In our manufacture of cores ranging in size from very small ones to those weighing up to two tons, we have experienced no trouble since using Linoil because of its uniform high quality, and are very well satisfied with the results obtained. The type of castings we produce are illustrated by the attached photographs. I would not hesitate to recommend the use of Linoil to any one in the production of products similar to ours and am glad to have had this opportunity of recommending a very worthy product."

THE WERNER Co.
(DIVISION OF ARCHER
2191 WEST 110 STREET WOODBINE

...WER CASTINGS

ONE hundred thirty-five days from clearing site to taking off iron, is the record of the new 294′ x 425′ foundry at Sunnyvale of the Joshua Hendy Iron Works. The unit has a capacity of 2000 tons a month and Hendy is credited with being the largest producer of Marine engines in the United States. The assembled engine (see illustration) is used in the famous Liberty ships, and is but one of four distinct types of high-powered marine engines made here. Superintendent Knutson developed a clever cope clamping device for the pit molds which eliminates weights and much crane work. Both the Sunnyvale and Pomona foundries of Hendy use Linoil. Superintendent Knutson's report on Linoil is on the opposite page under his picture.

LINOIL

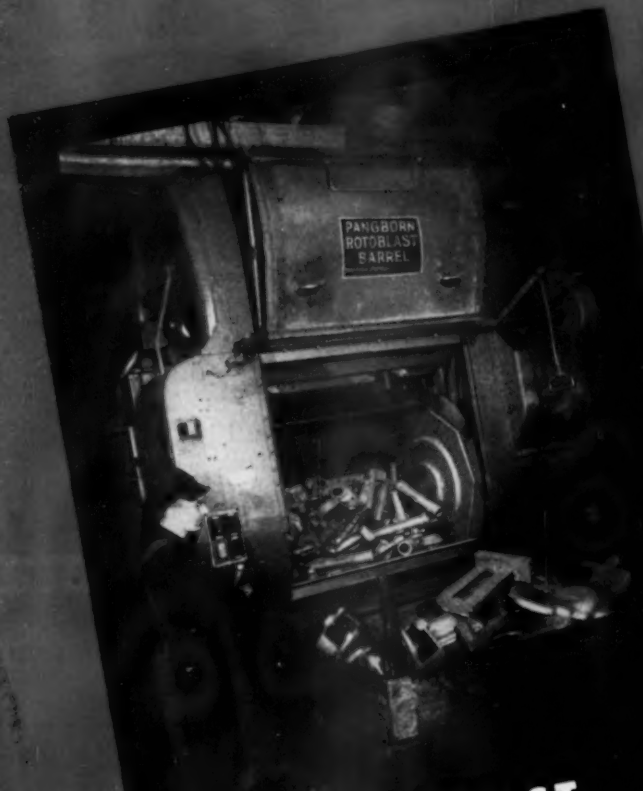
Many foundrymen consider it sound practice to standardize on Linoil, to take a little time to determine minimum requirements, then to establish a fixed routine and see that it is exactly carried out. For instance, the mixer should know how much oil is to be used to a given weight of sand and it should be impressed upon him that exactly that much should be used—no guess work, no extra dash for good luck. The time required for mixing should be exactly fixed and adhered to, and the same with oven temperature and drying time. Sand quality, size, and tempering must be unvarying, and the core must be properly rammed, turned, and handled while green. This done and the routine religiously followed your foundry will be free from core trouble, for Linoil is uniform, month after month, year after year, decade after decade.

...SMITH COMPANY

(DANIELS - MIDLAND COMPANY)

690 CLEVELAND, OHIO 2

$1,036,830.50=



ROTOBLAST BARRELS

● Expertly engineered, compactly designed and sturdily built airless cleaning Barrels extensively used for speedy production and lower costs. Sizes from 3½ to 28 cubic feet capacities.

ROTOBLAST TABLES

● Single and Multiple Spindle airless Tables bring economies and increased production in cleaning flat and fragile work not adapted to tumbling. The revolving platform carries the work through the abrasive blast zone.

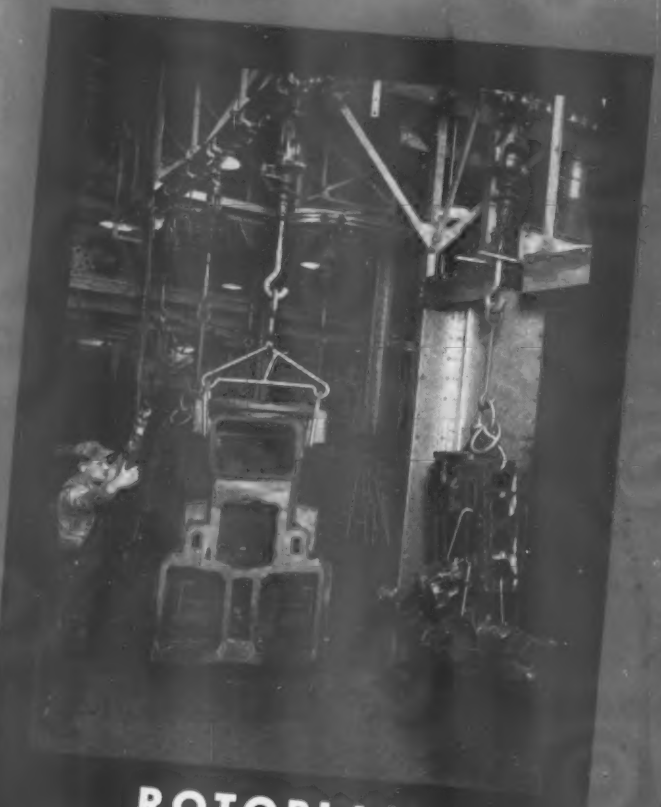
4 concerns—since January 1942—have invested a total of $1,036,830.50 in Pangborn blast cleaning and dust control equipment. As the engineering staffs in these organizations are second to none in thoroughness of

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

PANGBORN CORPORATION . . . . . .

=CONFIDENCE



ROTOBLAST CABINETS

● Special semi, or fully automatic installations exactly designed and built to clean unusual sizes and shapes of gray iron, steel and malleable castings, forgings, heat-treated parts, etc.

AIRBLAST ROOMS

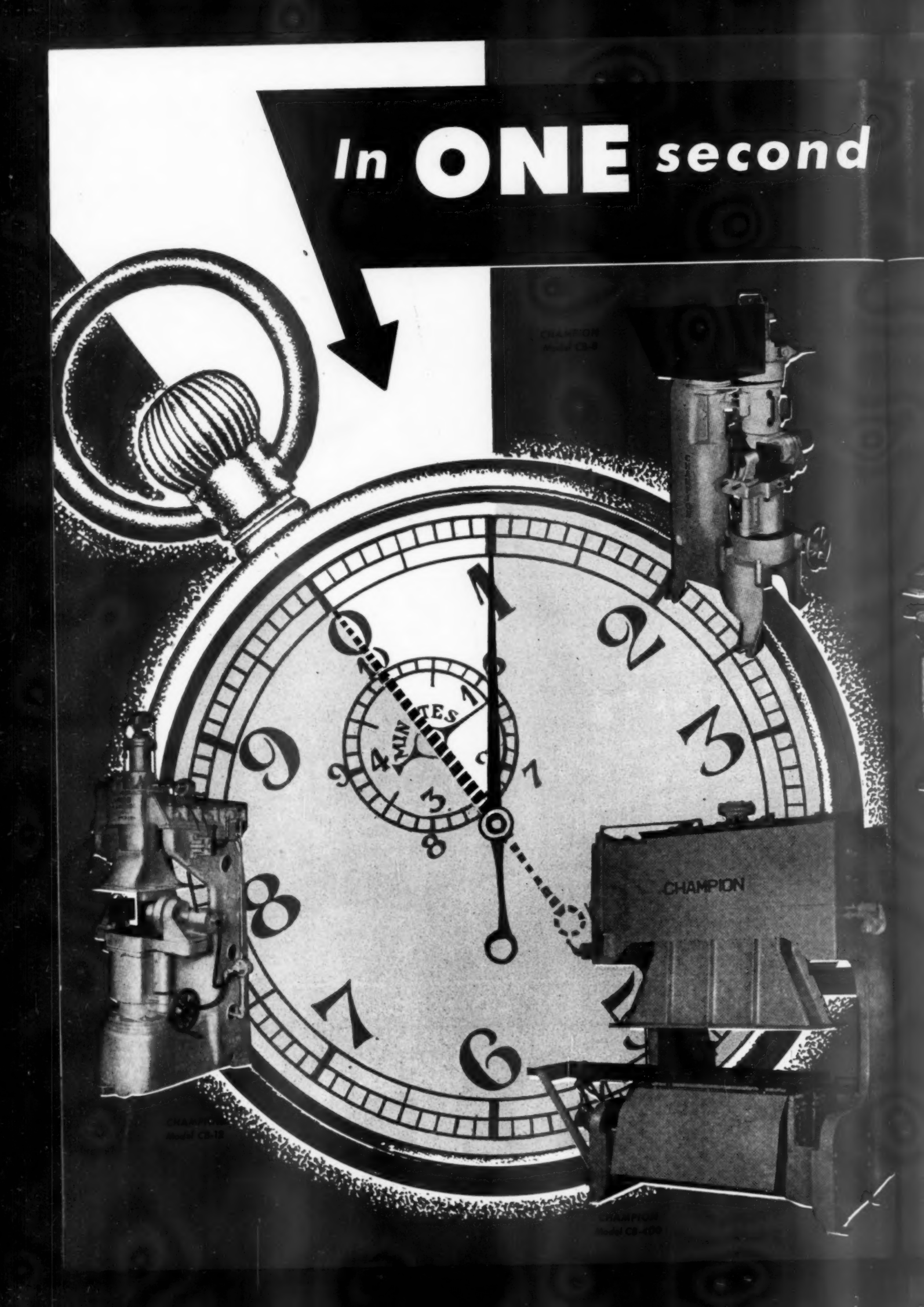
● For large miscellaneous shaped castings a dust tight, air ventilated room, properly illuminated for clear vision, is the most efficient and economical method for blast cleaning.

investigation—and all items were purchased in competitive markets—the 7,673 square feet of Airblast ROOM area and the 31 ROTOBLAST units involved emphasize the CONFIDENCE these buyers have in Pangborn leadership.

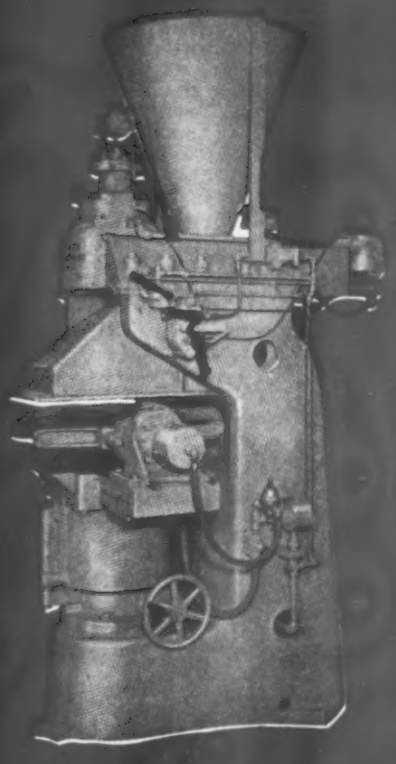
CLEANING AND DUST CONTROL EQUIPMENT

BORN

. . . . . HAGERSTOWN, MARYLAND


In ONE second
CHAMPION
MINUTES

Champion core blowers deliver cores of unequalled accuracy and uniformity



Speed, accuracy and uniformity are synonymous with Champion's four great core blowers—a selection of models to meet the most specific demands of your foundry.

Any man, woman or child can produce perfectly rammed cores at high speed and low cost with a Champion Core Blower. The operator merely sets the box, pulls the lever, and in a single second a core of unequalled accuracy and uniformity is delivered.

A single valve operates the core box clamp, clamps it against the blow plate, blows the core, exhausts and releases the clamps in the proper cycle.

The rigid one-piece, cast-steel frame insures accurate alignment of core box and blow plate. Exclusive Air Operated Hydraulic Clamp (patented) locks the core box securely against split box separation. Instantaneous blow valve action produces 25% more blow power, decreases air leakage and prevents pressure dissipation.

Remember, when you buy a Champion Core Blower that your order entitles you to call upon Champion's 47 years of experience in the design, construction and application of molding and core machines.

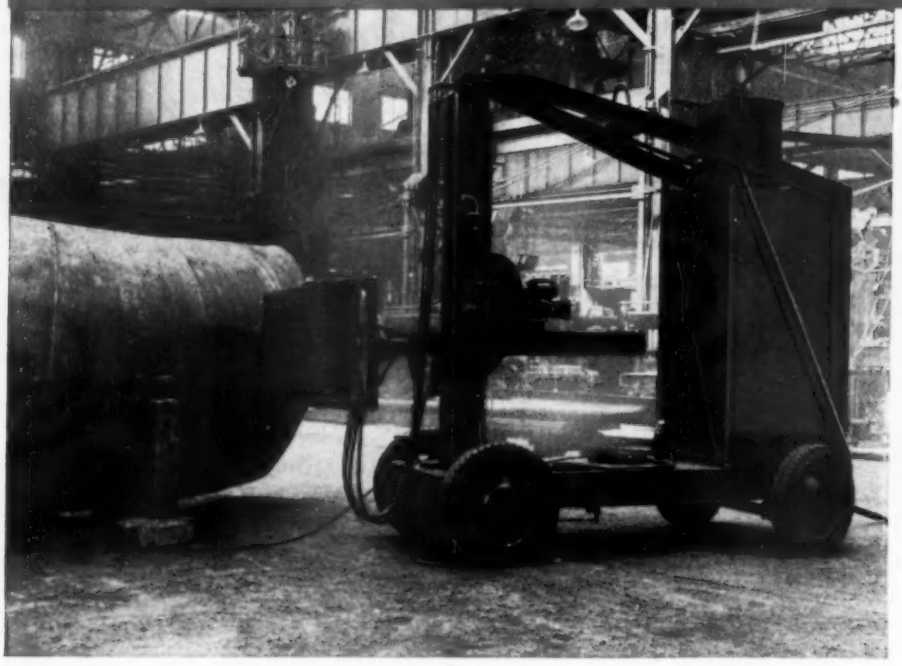
May we suggest that you write us for complete data on these most modern and most efficient Core Blowers. Of course, there is no obligation.

CHAMPION

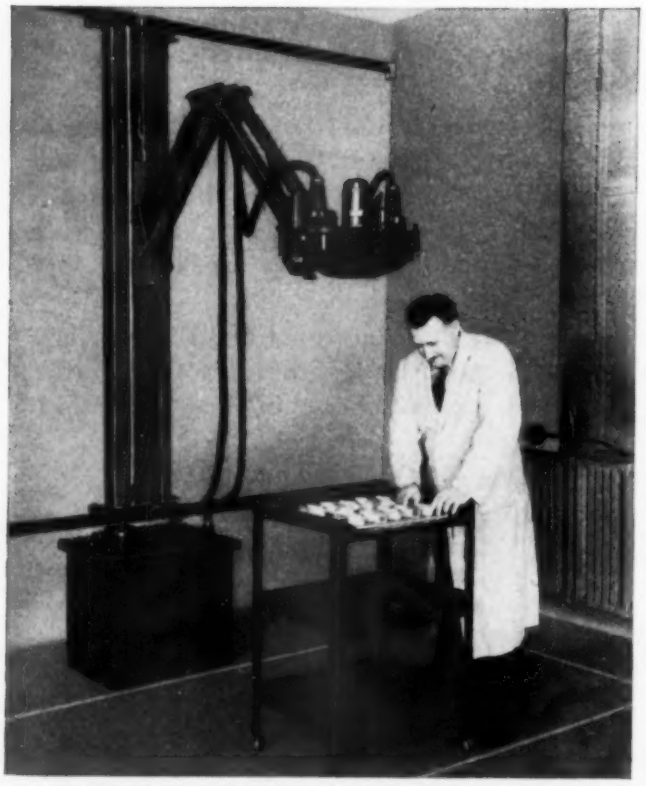
FOUNDRY & MACHINE CO.

1318 West 21st Street, Chicago

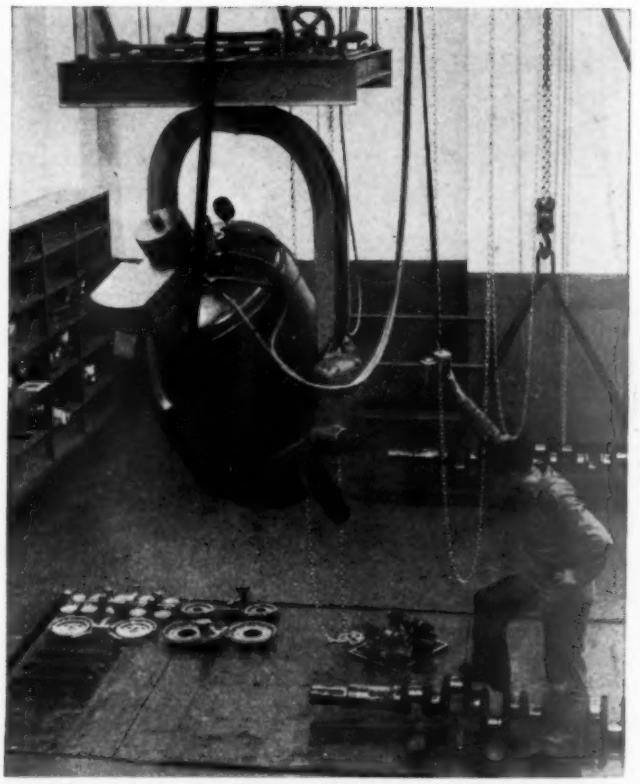
THERE'S A G-E X-RAY UNIT FORE



In 1939, G-E X-Ray introduced this mobile jib crane truck mounting which provides an unusual degree of flexibility and permits easy, accurate positioning for practically all types of radiographic inspection. The tube head column can be rotated 360° about its vertical axis and has a radiographic area of 270° around the chassis. The travel range of the tube head is 6 feet vertical and 4 feet horizontal. This unit can be moved about the plant very easily by available man-power; for long hauls a tractor can be coupled to the unit and it can be moved to the job. This unit is available for use either with the G-E Model OX-200 (200,000-volt) or the G-E Model OX-250 (250,000-volt) Industrial X-Ray Units. Within their range, these x-ray units offer fast radiographic inspection of castings and weldments which cannot be conveniently moved to the x-ray inspection department.



In 1938, G-E X-Ray introduced the OX-140 (140,000-volt) unit — designed and built expressly to meet the low-voltage radiographic inspection needs of the light alloy casting industry. Shown here is the G-E Model S-57 wall-mounted tube stand which provides complete flexibility and wide useful radiographic area; transformer can be arranged for floor or ceiling mounting. The OX-140 mobile truck unit provides the same degree of flexibility and angulation available with the wall-mounted stand.



In 1941, G-E X-Ray introduced the 1,000,000-volt Industrial X-Ray Unit, shown here mounted on an overhead bridge crane which provides the complete flexibility necessary to facilitate fast radiographic inspection of large, heavy specimens. 5¼-inch welded plate can be radiographed in 10 minutes with the G-E million-volt unit as compared with the 7½-hour exposure formerly required to do the same job. The G-E 1,000 Kvp. unit does the job faster, and the end results are materially better and provide more diagnostic information.

OREVERY INSPECTION PROBLEM

In 1942, G-E X-Ray introduced the Semi-Automatic Unit which provides rapid, accurate production-line x-ray examination of light alloy castings or metal assemblies.

For more than 25 years G-E Engineers have designed and manufactured x-ray diffraction equipment. The G-E XRD-1 Unit is the logical culmination of these years of experience and it has been accepted by chemists, engineers, and metallurgists as unparalleled for precision research.

HUNDREDS of high-powered G-E Industrial X-Ray Units are in daily use inspecting vital materials manufactured for the United Nations. With today's increased production schedules it is necessary to insure quality, save time and cut rejects to a minimum so that the flow of essential war materials will not be interrupted.

G-E Industrial X-Ray Units are designed from the drawing board on up for *industrial* use. They incorporate x-ray transformers and tubes, controls, and mountings especially designed for industrial service. Strength and durability are built into each unit to insure a maximum of uninterrupted service.

G-E X-Ray offers you the services of its corps of industrial x-ray engineers who have a background of more than 20 years' experience in applying x-ray examination in foundries, welding shops, aircraft factories, and other manufacturing establishments. They are aware of the production and inspection problems which are encountered in modern industrial practices. You can depend upon their recommendation as to which G-E Industrial X-Ray Unit will provide complete x-ray inspection in an *economical time.* And if x-ray inspection cannot be applied effectively and economically—they will be the first to tell you.

We are interested in a G-E Industrial X-Ray Unit to examine

- ☐ Aluminum-base castings.....inches thick.
- ☐ Zinc base castings.....inches thick.
- ☐ Copper base castings.....inches thick.
- ☐ Iron base castings.....inches thick.
- ☐ Weldments ☐ X-Ray Diffraction

Please have your engineer phone me for an appointment at my convenience.

Name_____

Title_____

Company_____

City_____ State_____

(Attach to your company letterhead) N311

ARMY E NAVY

Today's Best Buy—U. S. War Bonds

GENERAL ELECTRIC
X-RAY CORPORATION
2012 JACKSON BLVD. CHICAGO (ILL.) U.S.A.

DON'T SHOOT...YOU'RE NEEDED ON THE PRODUCTION LINE!

DELTA CORE AND MOLD WASHES

For STEEL – DELTA STEELKOAT
DELTA SPECIAL CORE & MOLD WASH

For GREY IRON – DELTA GRAKOAT

MALLEABLE – DELTA BLAKOAT

NON-FERROUS METALS – DELTA NON-FERRUSKOAT

Other popular DELTA Foundry Products
DELTA PARTEX – Nut Shell Parting
DELTA NO-VEIN COMPOUND
DELTA SPRAY BINDERS
DELTA MUDDING COMPOUND
DELTA CORE OILS

We wouldn't want to see you resort to such drastic action just because the problem of finding the right core and mold wash had gotten you down...

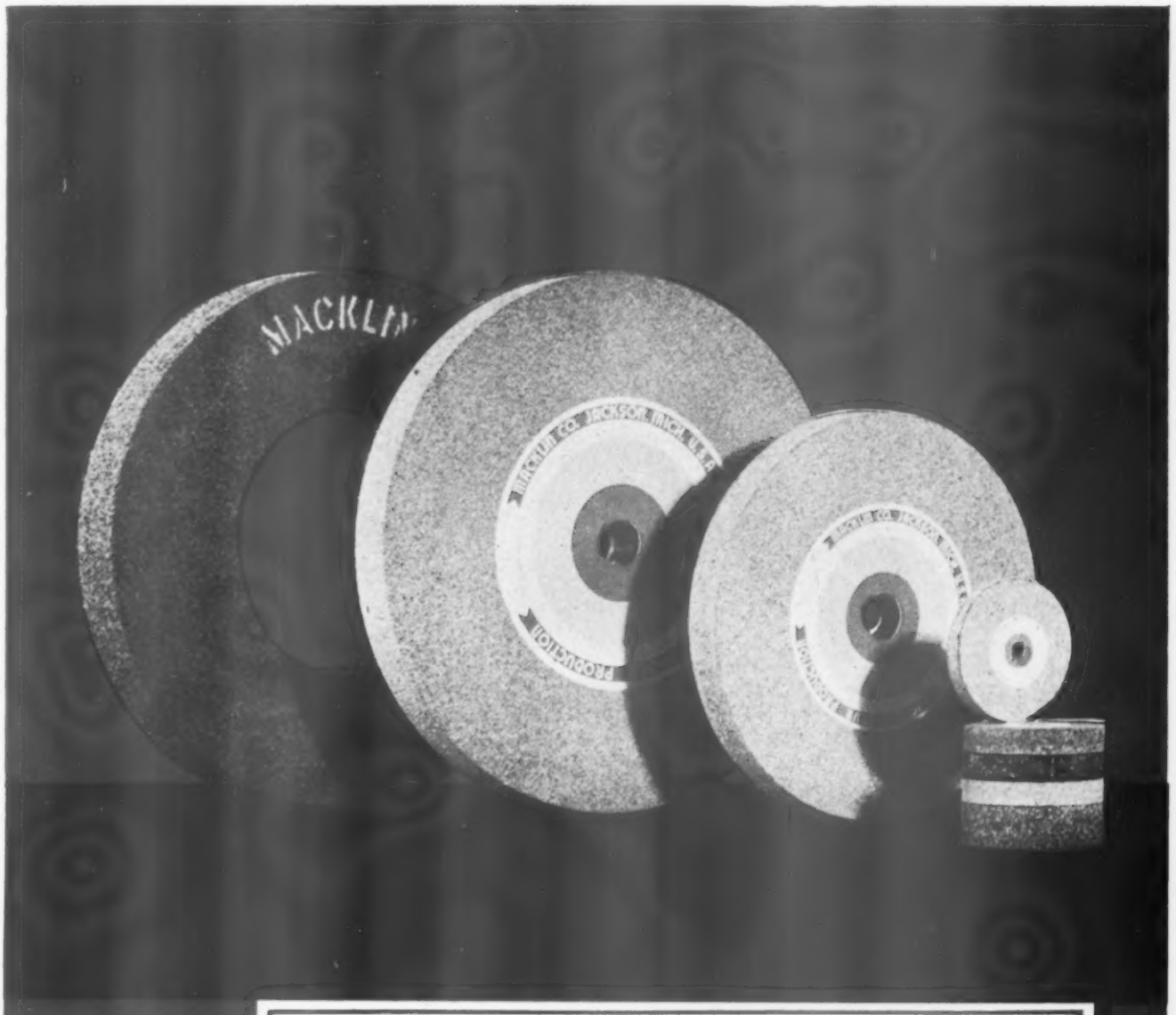
BECAUSE YOU CAN AVOID THAT SINKING FEELING IF YOU USE DELTA CORE AND MOLD WASHES.

The nation's largest foundries... with outstanding production records... use DELTA Core and Mold Washes to help maintain their enviable reputation for high speed production.

For cleaner, better finished castings... for an absolute minimum of cleaning room time and cost USE DELTA CORE AND MOLD WASHES.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF
INDUSTRIAL AND AUTOMOTIVE OILS, GREASES AND COMPOUNDS
MILWAUKEE 9, WISCONSIN



MACKLIN
GRINDING WHEELS

This FREE 64-page book still available. Write for your copies.

MACKLIN high quality wheels
for every grinding purpose will
"Protect Your Production"

MACKLIN COMPANY
Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.
Distributors in all principal cities
Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

"are you being panned"?

Mr. Cupola Man: Is there criticism in the ranks. Are you possibly being "panned" by the higher-ups who report that your iron is running below the normal standard.

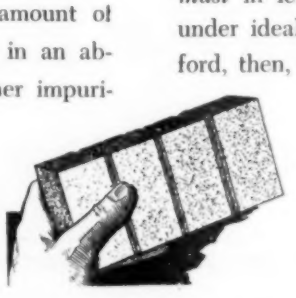
We who are familiar with the unprecedented situation you face not only sympathize with your difficulties but have available a conclusively proved method of eliminating them.

In the face of demands for denser, stronger, more machineable castings many foundries are forced to use a disproportionate amount of dirty, inferior scrap. This results in an abnormal percentage of slag and other impurities and a lowered grade of iron.

The solution of the difficulty lies in purging the melt of these impurities and the means of doing this is available through consistent use of Famous CORNELL Cupola FLUX.

This flux aids in producing a hotter iron. As the melt becomes more fluid the slag and other impurities are discharged through a more active slag hole—and a purer iron of higher quality takes form in better castings.

Famous CORNELL Cupola FLUX has been a *must* in leading foundries for over 25 years under ideal conditions. Can any foundry afford, then, not to investigate its valuable performance in view of the present situation?



Famous CORNELL Cupola FLUX in the handy brick form. A brick to a ton—a briquette for each 500 pounds of metal. Fast, convenient, economical to use.

The CLEVELAND FLUX *Co.*

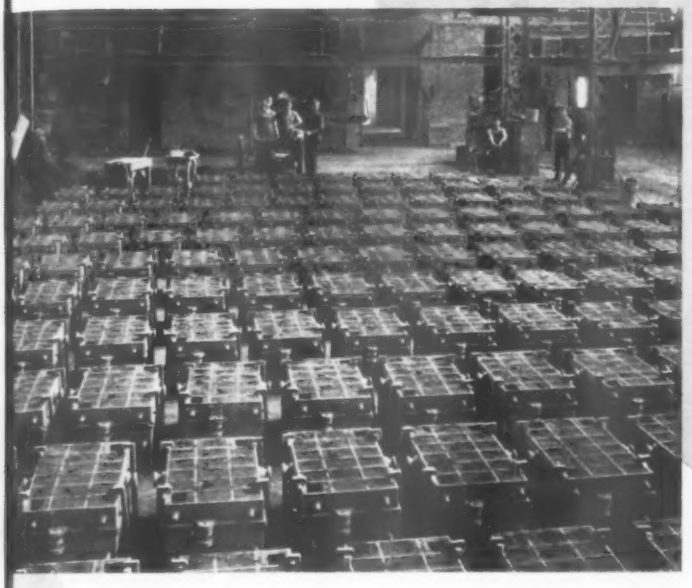
Manufacturers of Iron, Brass and Aluminum Flux Since 1918

1026-36 Main Ave., N.W.

CLEVELAND, OHIO

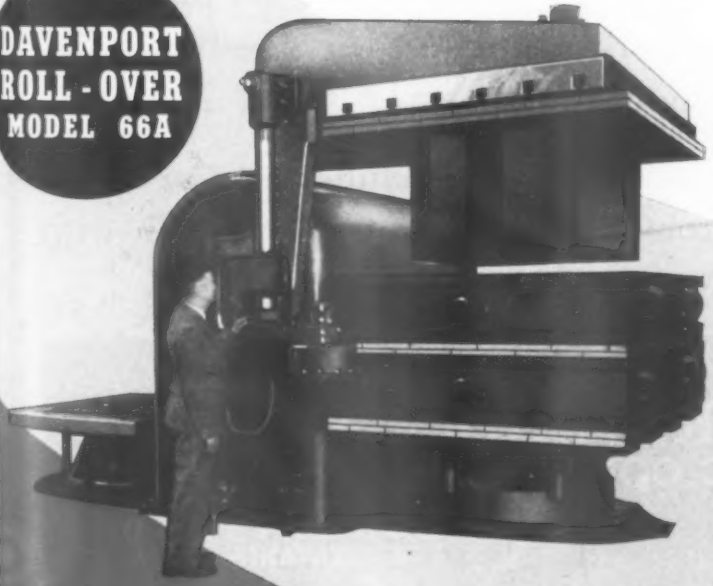
MAKE MOLDS FASTER

DAVENPORT
MOLDING MACHINES



DAVENPORT ROLL-OVER MODEL 40A

DAVENPORT ROLL-OVER MODEL 66A



Fast
PRECISION MOLDING

Is now more essential than ever before. "DAVENPORT" Molding Machines are working day and night in the foundries of America. Steel, Malleable, Gray Iron, also Magnesium and other Non-Ferrous Cast Metals require America's highest efficiency. See that your foundry is equipped with the Modern "DAVENPORT" foundry molding machines for fast, precision molding.

When the war is won, will your foundry be amply equipped to meet the world's competition?

Let us send you our catalog.

"DAVENPORT" LINE OF MOLDING MACHINES

JOLT ROLLOVER DRAW MACHINE
- Model SA (Seven sizes)
  Capacity from 750 to 12,000 lbs.
- Model A (Six sizes)
  Capacity from 1,000 to 12,000 lbs.

JOLT PIN-LIFT OR PUSH-OFF MACHINES
(With Adjustable Lift Pins)
- Six sizes—Capacity from 1,000 to 10,000 lbs.

PLAIN JOLT MACHINES
- Fourteen sizes—Capacity from 200 to 25,000 lbs.

DAVENPORT MACHINE & FOUNDRY CO.
DAVENPORT IOWA, U. S. A.

FOR CONTINUOUS CAPACITY OPERATION . . .

The CLEARFIELD MIXER IS TOPS!

FOUNDRY SAND

DELIVERED TO SUIT YOUR EXACT REQUIREMENTS

The "no time lost" of CLEARFIELDS on important war production work points to their possibilities on your sand mixing operations.

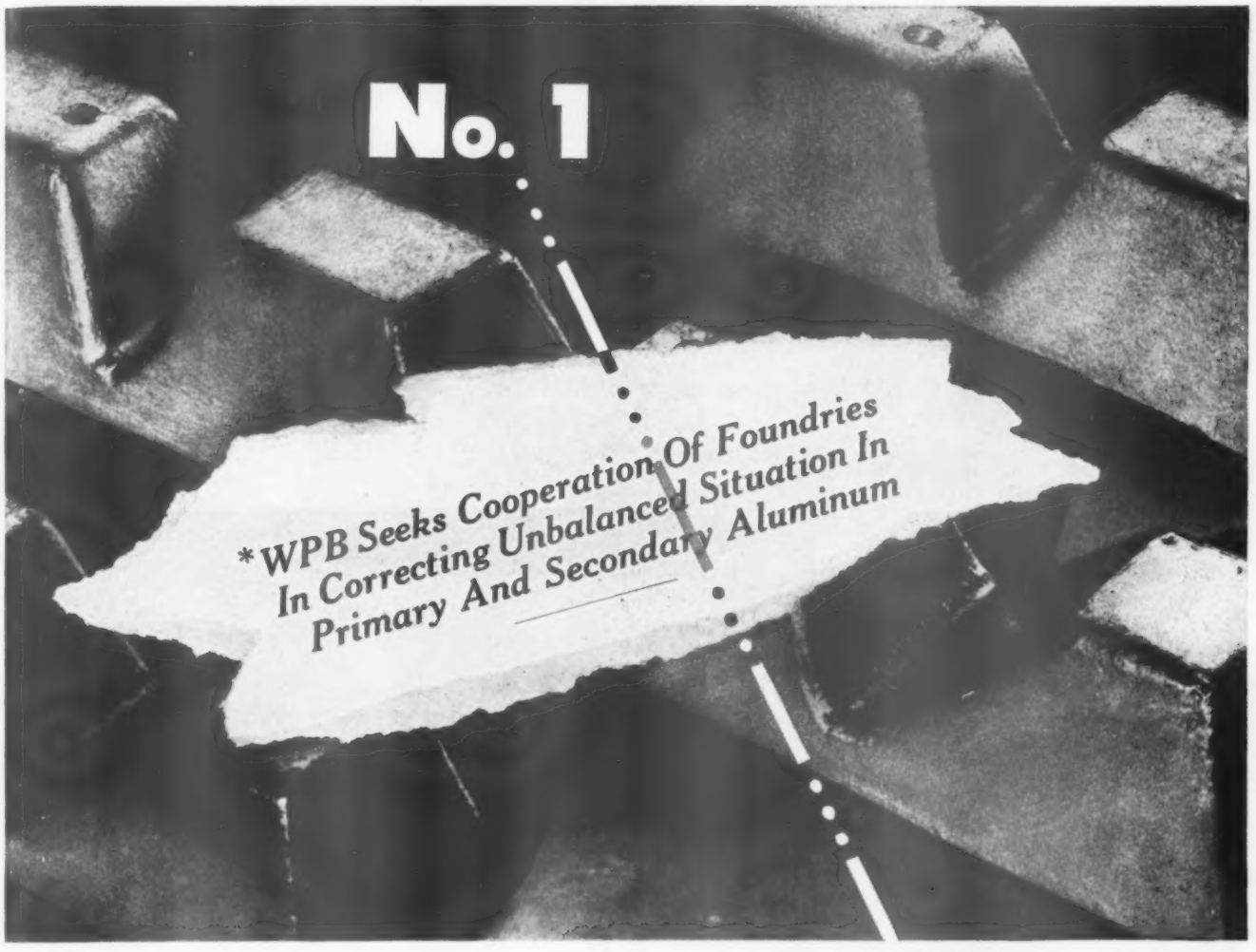
The complete Clearfield line includes mixing equipment in sizes from 4 to 40 cubic feet per batch with optional features to meet special requirements.

WRITE

If you desire a definite proposal, please state quantity and type of sand to be conditioned and characteristics of available electric current. Information and estimates promptly furnished.

CLEARFIELD MACHINE COMPANY

CLEARFIELD PENNSYLVANIA, U. S. A.



SECONDARY ALUMINUM CAME FIRST IN BREAKING PRODUCTION'S DAM

● When war production was threatened by the scarcity of primary aluminum, it was secondary aluminum . . . aluminum alloys as produced by the members of the Aluminum Research Institute . . . that came to the rescue. These producers of alloyed aluminum recognized the great responsibility that was theirs . . . and stepped in and did the job.

The companies listed here are employing scientific research and discovery to consolidate the war-won acclaim of their aluminum alloys.

Now these aluminum alloys are helping to win the war by meeting the approved and rigid specifications demanded by war production. In the same decisive spirit these aluminum alloys will meet the industrial challenges of peace.

Aluminum and Magnesium, Inc.
Sandusky, Ohio

The American Metal Company, Limited
New York City

Apex Smelting Co.
Chicago, Illinois

The Cleveland Electro Metals Co.
Cleveland, Ohio

Federated Metals Division American Smelting and Refining Company
New York City and Branches

General Smelting Company
Philadelphia, Pennsylvania

William F. Jobbins, Inc.
Aurora, Illinois

R. Lavin & Sons, Inc.
Chicago, Illinois

The National Smelting Company
Cleveland, Ohio

Niagara Falls Smelting & Refining Co.
Buffalo, New York

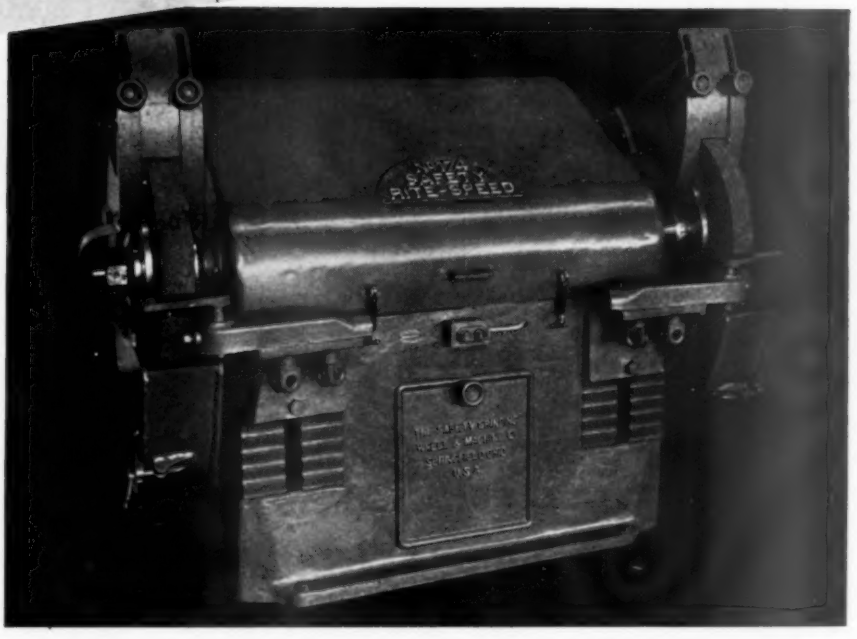
Sonken-Galamba Corporation
Kansas City, Kansas

U. S. Reduction Co.
East Chicago, Indiana

ALUMINUM RESEARCH INSTITUTE
308 West Washington Street, Chicago 6, Illinois

*From American Metal Market, July 22, 1943.

MORE SPEED for Victory



SAFETY "Rite-Speed" GRINDERS

SPEED THE RIGHT KIND OF WORK . . .

EMBODYING unique and distinctive features that make possible high-speed grinding operations with maximum precision efficiency, Safety RITE-SPEED Grinders are contributing notably to the whole war effort. For Safety RITE-SPEED Grinders provide:

1. Positive safe means for maintaining grinding wheel surface speeds suitable for the fastest, most efficient production.
2. Automatic "interlock" which cuts off power when grinding wheels wear to predetermined diameters—assuring safety and economy.
3. "Changeable Speed System" to reestablish correct surface speeds by increasing r.p.m. of spindle at various diameters.

These outstanding SAFETY features combine to produce *better work* and *more work* in *less time* . . . speeding "home-front" production to speed "fighting-front" victories. Let the great new Safety RITE-SPEED Grinder increase production, efficiency, and economy in your plant.

SAFETY GRIP-LOK GRINDING WHEELS INCREASE PRODUCTION—REDUCE ACCIDENTS

However complex your grinding wheel requirements, there is a specific Safety GRIP-LOK Grinding Wheel to do the job at hand with maximum efficiency, safety and economy. Not only are Safety Grinding Wheels noted for high quality and long life, but the Safety GRIP-LOK construction prevents broken wheel segments from flying outwardly—protecting both operators and property. Write today for complete details.

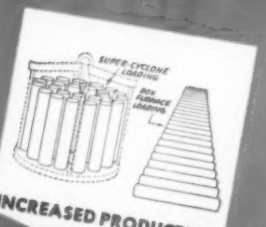
SAFETY

THE SAFETY GRINDING WHEEL & MACHINE COMPANY

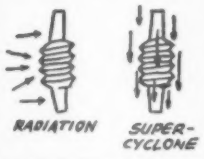
MAIN OFFICE AND FACTORY — SPRINGFIELD, OHIO

You get these advantages with the

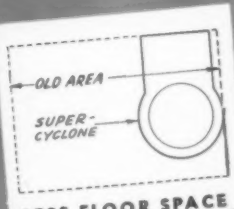
LINDBERG SUPER-CYCLONE



INCREASED PRODUCTION



STRAIGHTER WORK



LESS FLOOR SPACE

Large loads are accurately heated and easily handled

The revolutionary idea of heating steel to 1750°F. with recirculated air is embodied in the Lindberg Super-Cyclone Furnace. This principle with its accuracy, rapid uniformity and close control of heating offers many advantages, a few of which are listed below.

INCREASED PRODUCTION

The Super-Cyclone Furnace has increased production in the hardening of shells, rifle barrels, flanges, slip yokes, worm gears, bearing races, tank parts and hundreds of similar items. In some cases, production has increased *twelve times* over older methods of heat treating. Bulletin 130 shows how you can figure possible production increases on your own work.

STRAIGHTER WORK

The Super-Cyclone's 100% forced convection heating principle heats the work rapidly and uniformly and eliminates the possibility of one-sided or radiant heat from striking the charge and causing distortion. Straightening time is eliminated or reduced to a minimum. Valuable man hours are released from the press for other work.

LESS FLOOR SPACE

Based on averages of what the Super-Cyclone has done in other plants, you can figure that it will not occupy more than 1/3rd the floor area demanded by conventional equipment to handle the same or greatly increased production.

EXTRA MAN HOURS AVAILABLE

The Super-Cyclone method of handling work on fixtures or in baskets, eliminates the individual handling of parts in heating and quenching. In many plants, lone operators handle large loads through successive steps of heat treatment, for example, forgings are normalized, hardened and tempered in the same Super-Cyclone without being removed from the fixture.

SPECIAL HEATING

Because the Super-Cyclone can be heated at any desired rate to 1750°F. and cooled according to a definite schedule, it is well suited to stress relieving, cycle annealing, malleablizing, and other heating operations requiring a specific cycle. Write for the Super-Cyclone Bulletin 130.

LINDBERG ENGINEERING COMPANY
2453 West Hubbard Street • Chicago 12

ARMY (E) NAVY

LINDBERG FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

Let's Look at the Record!

CARL-MAYER Ovens for MAGNESIUM and ALUMINUM

When new problems arise in foundry production, involving oven equipment, you can depend on Carl-Mayer for a prompt, efficient and economical solution. Take for instance, in the field of magnesium and aluminum, Carl-Mayer creative engineering is playing an important role in both production and quality. The installations referred to are among the largest made in this country and involve principles in design exclusively Carl-Mayer . . . . By installing Carl-Mayer ovens now, you will greatly aid production and lay a foundation for highest efficiency and economy in post-war competition.

Ask a Carl-Mayer engineer to call and submit our suggestions. No obligation. Or write for Bulletin 141.

This is a typical illustration of a partial Carl-Mayer oven installation. Owing to complex surroundings or war-time conditions photographs of recent jobs are not obtainable.

AMONG THE BIGGEST PRODUCERS OF MAGNESIUM AND ALUMINUM CASTINGS: ARE CARL-MAYER CUSTOMERS

ALUMINUM CO. OF AMERICA
Cleveland, Bridgeport, Buffalo and Los Angeles plants
(*Aluminum and Magnesium*)

- 52 Double Rack Core Ovens
- 2 Large Vertical Core Ovens
- 5 Heat Treating Ovens
- 3 Straightening Ovens
- 2 Continuous Furnaces
- 2 Batch Type Furnaces

AMERICAN RADIATOR & STANDARD SANITARY CORP.
Elyria, Ohio Plant
(*Magnesium*)

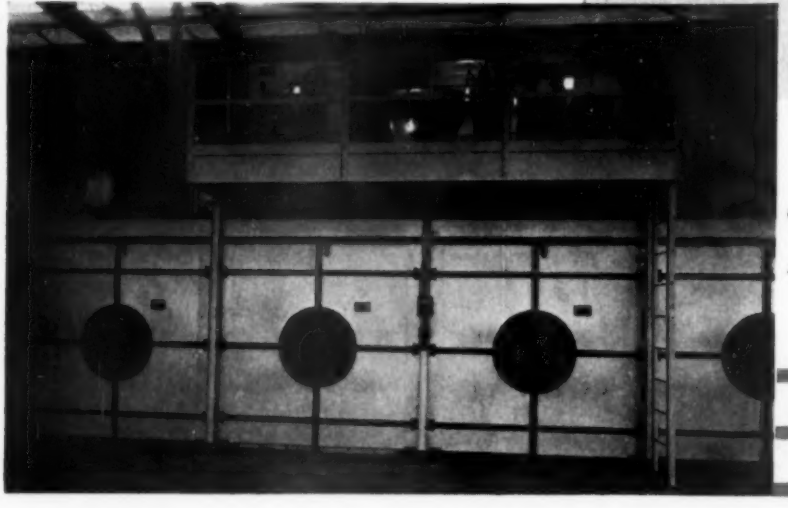
- 12 Double Rack Core Ovens
- 2 Double Rack Heat Treating Ovens
- 3 Impregnating Ovens
- 2 Straightening Ovens

ECLIPSE AVIATION
Bendix, Bergen, N. J. and Philadelphia plants
(*Magnesium*)

- 3 Large Monorail Core Ovens
- 1 Large Vertical Core Oven
- 5 Vertical Paint Ovens
- 1 Horizontal Paint Oven

FORD MOTOR CO., River Rouge plant
(*Aluminum*)
For Airplane Engine Castings

- 4 Monorail Core Ovens, each 170'-0" long, using over 1200' conveyor per oven.
- 8 Vertical Core Ovens
- **Numerous** Conveyor Type HeatTreating Furnaces.



The Carl-Mayer Corporation
3030 Euclid Ave. *Cleveland, Ohio*

• • •

CORE OVENS, MOLD OVENS
HEAT TREATING OVENS, FURNACES
STRAIGHTENING OVENS, ETC.

NO MUSCLE REQUIRED

to transport

TONS

Automatic TRANSPORTER

TRANSPORTER

PLATFORM TYPE

Model "TN-4 and TW-4" 4000 Pound Capacity and Model "TN-6 and TW-6" 6000 Pound Capacity "TRANSPORTER" Platform Type Lift Trucks for Skid Platforms. Standard Platform Lengths 36" to 72" in 12" Steps. Widths 20" and 26½"; Heights in Low Position 6"; 7"; 9"; 11".

MANPOWER - NO PROBLEM

★ ***Inexperienced Help***—girls or men—with the TRANSPORTER can move thousands of pounds of materials in a minimum of time and,—it doesn't take muscle either — the TRANSPORTER does all the "muscle work"—the operator merely guides the load, holding the handle in which are located the controls for starting, braking and reversing.

Here is speed, safety, cost savings—in intra-plant transportation. This battery powered equipment is adaptable to short hauls and for use in elevators, narrow aisles, and areas where floor loads are restricted. It supplements larger industrial trucks to effect a complete handling system.

Write for Details

POSITIVE MECHANICAL BRAKE

FRONT WHEEL POWER DRIVE

CONTROLS IN STEERING HANDLE

SHOCKLESS HYDRAULIC PLATFORM LIFT WITH EASY FOOT CONTROL

Write FOR DETAILS

AUTOMATIC TRANSPORTATION COMPANY

Div. of the Yale and Towne Mfg. Co.

121 WEST 87th STREET CHICAGO 20, ILLINOIS

MANUFACTURERS FOR OVER 35 YEARS ELECTRIC PROPELLED INDUSTRIAL TRUCKS

The Story of a SECRET AIR WEAPON

. . . Now on the U.S.S. Helena 40 Fathoms Down—In Kula Gulf

When a development comes along, so different that the U. S. Navy takes it over—lock, stock and barrel, that's big news—and has implications for all business and industry.

Even before Pearl Harbor, America's fighting fleet was being designed to pack more power and more armament, ship-for-ship, than anything else afloat. Space for ammunition and men had to be shrunk to the irreducible minimum. Any chance of saving weight and space in ventilating fans? Could the compactness of an axial flow fan be combined with the performance of a centrifugal fan?

1940—MORE SPEED AND ARMOR MEANS LESS SPACE FOR AUXILIARIES

From existing knowledge of fan performance, it seemed impossible. But, since one battleship needs as many as 300 separate ventilating systems, an attempt must be made.

The U. S. Navy Bureau of Ships wrote the toughest specifications they could devise—and then subsidized two separate research authorities to develop a fan to meet them. One was the country's outstanding industrial research laboratory—the other, one of the nation's foremost experts on aerodynamics. The results turned in were good, but not good enough.

Time was slipping away and, for the United States, war was just over the horizon. Then the Navy came to Sturtevant and put the job up to us—a fan to deliver 12,000 cubic feet a minute at 3" pressure and a speed of 1160 rpm.

As luck would have it, the Sturtevant Research Laboratory had been examining a new theory of designing propeller fans. When the Navy came to us, construction of a test fan had just been completed. Although no experimental work had been done on the fan, we

1941—THE NAVY ASKS THE IMPOSSIBLE—FINDS IT READY AND WAITING

brought it out for inspection. On the test block it delivered 12,000 cfm at 3" pressure—on the nose! And at 1750 rpm (which meant a further saving in motor weight) it showed a sound energy that was 40% under the Navy maximum! Performance astounded them—total efficiency 90%; static efficiency over 80%—better than anything ever achieved with centrifugal fans.

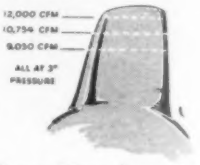
Next, a trial run at sea, aboard the U. S. S. HELENA. Success of the Sturtevant Victory Axiflo Fan, as it is now called, was written in the initial order for 280 units. Today, that original Axiflo Fan—the first, hand-built unit to embody this great step forward in air engineering, shares with the HELENA its hallowed grave in the waters of Kula Gulf.

THE AIRFOIL TESTS APPLIED TO A PROPELLER FAN

But let's return to the laboratory, for a minute with Harold F. Hagen, our Chief of Research. The new theory conceived by Mr. Hagen was based on the tests of airfoils in a wind tunnel. In putting this theory through its paces, however, he found that the straight line of airplane flow tests could not be applied directly to a fan propeller.

As the design progressed, the blade angles and area of blade surface proved to be just about equal to empirical designs. The result was a blade that does an equal amount of work throughout its entire surface. Air delivery of a specific fan, for example, was always at 3" pressure—with a volume proportional to the length of the blades.

THE RESULT OF A COMPLETELY THEORETICAL DESIGN



With the outbreak of war, Navy demands for Victory Axiflo Fans skyrocketed. Today, thousands of Sturtevant Victory Axiflo Fans are in service aboard battleships, cruisers, aircraft carriers, destroyers, subchasers—in fact every type of naval vessel. But even Sturtevant's great shops were unable to fill the demand. Other manufacturers were impressed by the extraordinary success of the new type of fan and followed Sturtevant's lead. Two were successful, and are now supplying excellent fans of their own.

Tomorrow, the Victory Axiflo Fan will be ready to serve the men who are waiting to open new fields of heating, ventilating, air conditioning, mechanical draft and other applications where fans are used.

B. F. STURTEVANT COMPANY
Hyde Park Boston 36, Mass.

Glance over the brief advantages below and then turn your imagination loose on the implications of the Sturtevant Victory Axiflow Fan *in your work* after the war.

POWER SAVINGS—extremely high fan efficiencies, flat horse power characteristic—making important operating economics in large installations.

SPACE SAVING—Only 60% of that required for other fan designs—with a similar saving in weight.

RANGE OF PRESSURES—from ⅛" to 60" water gauge—covering the entire field of commercial and industrial fan requirements.

EXTREME QUIET—less than 80 decibels, making it suitable for commercial heating, ventilating and air conditioning installations.

Sturtevant
REG. U.S. PAT. OFF.
Puts Air to Work

STURTEVANT—ORIGINATOR OF THE NAVY'S VICTORY AXIFLO FAN

The Model "NB-4" Royer used at one of the Vultee Aircraft foundries. There's a portable or stationary Royer model for every foundry—capacities up to 50 tons of correctly conditioned sand per hour. Stationary units are available for use in production foundry sand conditioning systems.

Over Enemy Lands Royer Plays its Part.

A number of factors contribute to the superiority of planes like the Vultee Vanguard, which are relentlessly clearing the skies of enemy aircraft.

One of these is sound castings—parts which withstand the stresses of high speed as well as terrific pressure and impact of combat.

The importance of proper sand conditioning to the maximum production of airplane castings is well recognized. That's why you will find Royer Sand Conditioners in the foundry of Vultee Aircraft, Inc., and those of other airplane manufacturers, as well as in a high percentage of other foundries with outstanding war production records. Over 5,000 Royers in service attest to the kind of "six point" sand conditioning job they do.

Royer-prepared sand is characterized by its light, velvety texture, even distribution of moisture, high permeability and absence of contamination. Use of the Royer results in better molds, smoother finish castings, reduced cleaning time, greatly reduced discount and increased production.

Royers are sold only by factory-trained sales engineers, with long experience in sand conditioning and molding problems. You can profit by their recommendations. Write for full information.

Now Make THOUSANDS More

THE ROYER

ROYER FOUNDRY & MACHINE CO. KINGSTON, PA.

"...for your fine r

NATIONAL

...record of performance..."

NAVY

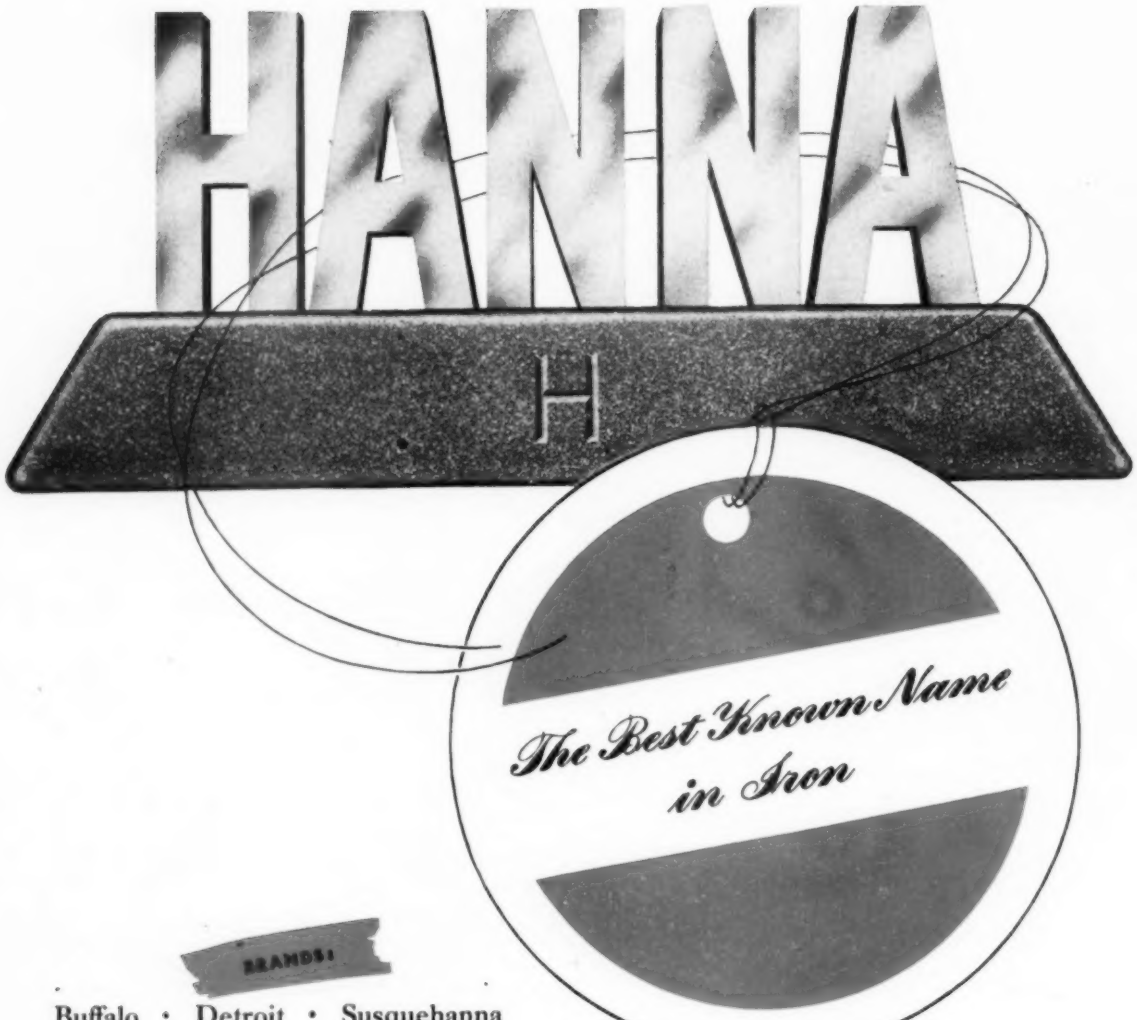
thank you, **Uncle Sam!**

● We, the men and women of National Engineering Company, are proud to receive the Army-Navy award for achievement in the production of equipment for the manufacture of the sinews of war . . . yet, we are humble in the realization that our part is but a small one. We are humble in the knowledge that our contribution toward victory is modest compared to that of our sons, husbands and brothers on the fighting fronts around the globe . . . again, thank you, Uncle Sam, for this banner. It will serve as a constant challenge to do our part toward the achievement of greater war production. . . .

L ENGINEERING CO.

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—Asquith Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co. Pty. Ltd., Sydney, Australia



BRANDS:

Buffalo • Detroit • Susquehanna

GRADES:

Basic • Foundry • Malleable • Ferro-Silicon • Silvery

THE HANNA FURNACE CORPORATION

Buffalo • Detroit • New York • Philadelphia • Boston

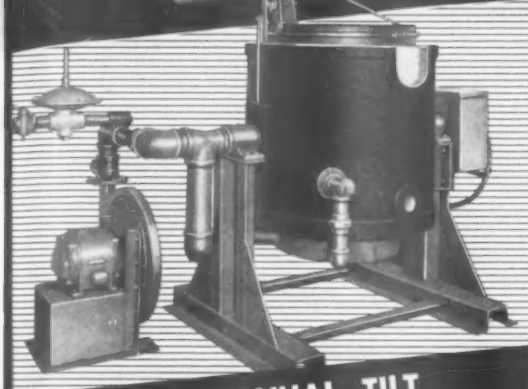
Merchant Pig Iron Division of

NATIONAL STEEL CORPORATION

Executive Offices: Pittsburgh, Pa.

KEEP THOSE PRODUCTION SCHEDULES Rolling!

Melting Brass, Aluminum, Magnesium or other Non-ferrous metals in your foundry? If so, you should investigate the Stroman Line of Melting Furnaces . . . for they are without a doubt the most efficient . . . THE RIGHT furnaces for your particular job. Now in heavy duty production in many nationally known war production plants they are proving their ability to "take it" . . . to deliver faultless production under the most trying circumstances. Stroman Melting Furnaces installed in your foundry will result in tremendous savings in man hours and fuel costs. WRITE FOR BULLETIN NO. 52. IT GIVES COMPLETE INFORMATION AND SPECIFICATIONS.



STROMAN MANUAL TILT CRUCIBLE MELTING FURNACES

For Brass, Bronze and Aluminum
Capacities from No. 40 to 400 Crucible

Large or small these manual tilting furnaces all embody the many Stroman exclusive features that assure foundrymen of perfect melting and absolute maintenance of production schedules. Fired by either gas or oil in conjunction with Stroman Blowers they hold fuel and power costs to a minimum. Built of welded steel throughout they last indefinitely, seldomly requiring any maintenance. Tilt mechanism is so simple, but fool-proof in operation that it is practically impossible for it to get out of order. Swing type cover is easiest to operate and speeds production.

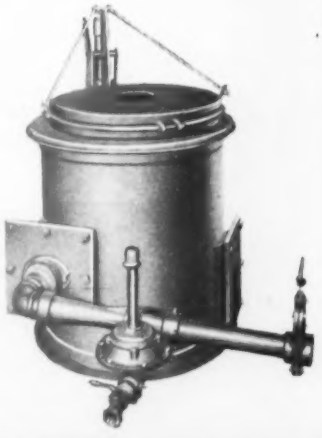
STROMAN STATIONARY CRUCIBLE MELTING FURNACES

For Brass, Bronze, Aluminum and other Alloys. Capacities from No. 20 to No. 400 Crucible.

Sturdy in construction, efficient in operation, most economical in fuel and maintenance costs, greater daily production, are just some of the features you are certain of securing with Stroman Crucible Melting Furnaces. Their streamlined design conserves valuable floor space . . . Oil or gas fire are equally efficient . . . Silicon Carbide linings are standard equipment . . . and three types of covers are available. The Push Back, Swing and Counter-Balanced. The last two are illustrated. All Stroman Furnaces may be purchased with or without Stroman Blowers.

STROMAN GAS FIRED FURNACES

. . . are equipped with proportional mixers. These mixers automatically proportion the ratio of gas and air to the burner . . . keep the correct proportions accurate at all times . . . assuring the maintenance of a constant furnace atmosphere so necessary in the melting of brass and aluminum alloys.



Stroman also makes Hydraulic and Mechanical Tilting Furnaces with Stationary Lip Pour, for melting Brass, Bronze, Aluminum, Magnesium and all other non-ferrous metals. Write for detailed folders.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO 6

NORBIDE NOZZLES *Save* Man-hours and Money

Savings in man-hours and money result from the use of long-lived NORBIDE liners in blast nozzles. Made of Norton Boron Carbide, the hardest man-made material for commercial use, NORBIDE liners increase nozzle life over other types hundreds, even thousands of times. Speed is the keynote in blast-cleaning vital war products such as shells and bombs. Frequent stops to change nozzles are banished when you use NORBIDE nozzles with their guaranteed life of 750 hours when used with sand, 1500 hours with steel shot or grit (often give over 2200 hours with steel grit).

N-59

NORTON COMPANY
WORCESTER 6, MASSACHUSETTS

Will your Foundry be ready for COMPETITION again?
Despatch vertical type conveyor core oven for volume production. Standard core ovens available in 63 standard sizes.
DUCT
DUCT

How Despatch Ovens and Furnaces Help You Start *Right*

It's no secret that successful operation of your foundry tomorrow will mean making *better* castings at *lower* cost, and giving your customers *better service*. That's why Despatch ovens are specially suited to the job and offer utmost advantages in getting started *now*.

CUTS OPERATING COST 3 WAYS

To assure better castings for your customers tomorrow, *cores* first of all must be of very high quality. Despatch core and mold ovens not only give uniform baking of all types of cores, but help keep your production costs down in three ways:

(1) maximum economy with gas, oil or electricity;
(2) automatic operation to eliminate manual control;
(3) labor-saving handling systems.

Write for free copy of "Successful New Foundry Methods." Fully illustrated.

Addition of a Despatch laboratory oven, too, allows accurate, low-cost tests of oils, sands, binders; a great time- and money-saver in core making.

ASSURES BETTER SERVICE TO CUSTOMERS

An important *new* step towards better service for your customers tomorrow is heat treatment (i. e., solution and aging heat treatment of aluminum and magnesium) or stress relief of castings in your own plant, under your own supervision.

Despatch furnaces are ideal for this, assuring maximum physical properties in castings at reasonable cost. They use little fuel, operate automatically and use labor to best advantage. An effective and highly profitable combination for *any* foundry. LET US HELP YOU *plan now for tomorrow*.

DESPATCH
OVEN COMPANY MINNEAPOLIS

Let's Look into the Future

Today, under industry's most trying and most exacting conditions, Hydro-Blast continues to fulfill the promises made for it when business was far below normal—again when business was beginning to lift itself out of the doldrums—and again when the overnight demand for castings presented a goal which no experienced foundryman believed possible of attainment.

Today, Hydro-Blast is decoring and surface cleaning all kinds of castings faster, better and cheaper. It is scrubbing the surfaces to microscopic cleanliness so that machining time and costs are greatly reduced. It is recovering for reuse tons and millions of tons of formerly wasted silica sand in better-than-new condition. It is releasing millions of transport ton miles so that troops, tanks, jeeps, guns and other war materiel may reach the most imperative positions at the earliest possible moment. Tomorrow, Hydro-Blast economies will enable the foundry to meet the highly competitive condition which is bound to obtain with the return of production for use.

THE **HYDRO-BLAST**
CORPORATION

2550 N. Western Ave., Chicago.

May we suggest that NOW is the time to find out the "how and why" of Hydro-Blast's record of returning the user's investment during the first year of operation

Mister—you're getting paid in DYNAMITE!

LET'S NOT KID OURSELVES about this. Our pay envelope today *is* dynamite.

If we handle it *wrong*, it can blow up in our face . . . lengthen the war . . . and maybe wreck *our* chances of having happiness and security *after* the war.

The wrong way to handle it...and why

The wrong way is for us to be good-time Charlies. To wink at prices that look too steep . . . telling ourselves we can afford to splurge.

We *can't* afford to—whether we're business men, farmers, or workers. And here's why:

Splurging will boost prices. First on one thing, then all along the line.

Then, wages will have to go up to meet higher prices. And higher wages will push prices up some more . . . faster and faster, like a runaway snowball.

The reason this can happen is that there is more money in pay envelopes today than there are things to buy with it. This year, we Americans will have *45 billion* dollars more income than there are goods and services to buy at present prices. *45 billion dollars extra money!*

That's the dynamite!

The right way to handle it...and why

Our Government is doing a lot of things to keep the cost of living from snow-balling.

Rationing helps. Price ceilings help. Wage-and-rent stabilization helps. Higher taxes help. They're *controls* on those dangerous excess dollars.

But the real control is in our hands. Yours. Mine.

It won't be fun. It will mean sacrifice and penny-pinching. But it's the only way we can win this war . . . pay for it . . . and keep America a going nation afterwards.

And, after all, the sacrifice of tightening our belts and doing without is a small sacrifice compared with giving your life or your blood in battle!

Here's what You must do

Buy only what you absolutely need. And this means absolutely. If you're tempted, think what a front-line soldier finds he can get along without.

Don't ask higher prices—for your own labor, your own services, or goods you sell. Resist pressure to force YOUR prices up.

Buy rationed goods only by exchanging stamps. Shun the Black Market as you would the plague.

Don't pay a cent above ceiling prices.

Take a grin-and-bear-it attitude on taxes. They must get heavier. But remember, these taxes help pay for Victory.

Pay off your debts. Don't make new ones. Getting yourself in the clear helps keep your Country in the clear.

Start a savings account. Buy and keep up adequate life insurance. This puts your dollars where they'll do you *good*.

Buy more War Bonds. Not just a "percent" that lets you feel patriotic, but enough so it *really* pinches your pocketbook.

If we do these things, we and our Government won't have to fight a post-war battle against collapsing prices and paralyzed business. It's *our* pay envelope. It's up to *us*.

KEEP PRICES DOWN!

Use it up • Wear it out
Make it do • Or do without

This advertisement, prepared by the War Advertising Council, is contributed by this Magazine in co-operation with the Magazine Publishers of America.

To the Foundrymen of America:

We pause for a brief moment to pay honest tribute to you of the nation's foundries—large and small. You represent a great industry which it has been our privilege to serve since November 1918.

Your resourcefulness has made America great in the past. Your devotion to the duty of production is winning the war today, and will influence materially the building of a better nation in the years that lie ahead.

As a company, we measure our own success in terms of the progress which you, with steady faith in the art of cast metal, have made in the past quarter century.

Today, with you, we are working for ever-increasing war production. Our plants and facilities are operating at mounting capacities to keep essential raw materials flowing unceasingly to your foundries, throughout the country.

On this, our anniversary, accept this personal expression of gratitude for your friendship and patronage which have contributed so greatly to our company's leadership in its field of service.

Great Lakes Foundry Sand Co.

Jno. D. Lonsworth
Chairman

President

THE GREAT LAKES FOUNDRY SAND CO.
DETROIT, MICH.
25TH ANNIVERSARY
1918 - 1943

Reporting

Great Lakes Foundry Sand Co. was incorporated in November, 1918, the month in which we celebrated the first Armistice Day, signalizing the close of World War I.

With this background of 25 years' experience in the production and use of foundry raw materials, our efforts are now being directed to supplying and servicing foundries and other industries whose products are essential to the winning of World War II.

The production facilities at our fire clay, molding and core sand properties include the most efficient types of mining and processing equipment. Our deposits of JUNIATA bank sand extend over two thousand acres, with a hundred years' visible supply. Our various operations are served by several miles of private sidings connecting with five railway systems.

Members

American Foundrymen's Association
Foundry Equipment Manufacturers' Association
National Industrial Sand Association
American Ceramic Society

Great Lakes Foundry

on 25 Years Service

Our Thanks—

To our customers for their patronage and for their acceptance of various new raw materials which we sponsored and developed over the years, typical of which are JUNIATA BANK SANDS and LAKEFIELD NEPHELINE SYENITE; all in general use throughout the United States and Canada.

Our Appreciation—

To Ottawa Silica Co., ABC Coal & Coke Co., American Nepheline Corporation, and our other nationally known sources, for their engineering service and cooperation in meeting the new specifications essential to the continuing improvements of foundry and ceramic practice.

Our Acknowledgment—

To the railroads of the United States and Canada for their splendid service in expediting our shipments.

Our Policy—

To continue improving the special services of our metallurgical, foundry, and sandblast engineering departments which we have extended continuously for the past twenty years. The ceramic engineering and research program which we started 8 years ago will continue to develop further uses for Nepheline Syenite.

Sand Co. United Artists Building
DETROIT 26, MICHIGAN

"FOUNDRY SAND CONTROL", written for us by Harry W. Dietert, was compiled to answer many questions on the correct use of foundry sands under varying conditions and to assist foundrymen in avoiding mistakes which may result in high scrap losses, thereby saving many man-hours of time. Information contained in this **copyrighted** book shows how to get the most out of foundry sands with a resultant increase in both quality and quantity of castings. Illustrated with both charts and photos, it is bound for easy and frequent reference. A copy of "FOUNDRY SAND CONTROL" should be in every foundry laboratory and superintendent's office.

Great Lakes Foundry Sand Co.

★ ★ ★ ★ THE GREAT LAKES LINE ★ ★ ★ ★

Juniata Bank Sands
Juniata Dried Sands
Lake Cicott Bank Sand
Lake Core Sands
Dried Core Sands
Molding Sands — Natural, Milled and Bond Blended
Illinois Crude Silica Sands
Ottawa Processed White Silica Sands
Diamond Blast Sand

Flint Shot Blast Sand
Gold Jacket Blast Sand
Ohio Quartz Blast Sand
Globe Shot and Grit
Volclay (Western) Bentonite
Panther Creek (Southern) Bentonite
Lawco Bonding Clays
Refracto Fire Clays
Fire Brick — Ohio and Indiana

Firestone — Sawed and Rough
Firegan
De-Sul-Flux
Limestone and Fluorspar
A. B. C. Foundry Coke
Tumbling Mill Stars
Stoody Borium Nozzles
Hard Iron Nozzles
Nepheline Syenite

MINERS • PROCESSORS • FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

TRIM, COMFORTABLE PROTECTION For Foundrymen's Legs and Ankles

Spring Type Legging For Molders. Made in Asbestos, Fire-Resistant Duck, Chrome Leather. Easy to put on and remove. Comfortable. Ample overlap for largest leg.

The AO 7 x 129 Spat. Has elastic top that gives it a very snug fit around leg, keeping sparks and molten particles from shoe tops. Body of spat made of first-grade chrome leather.

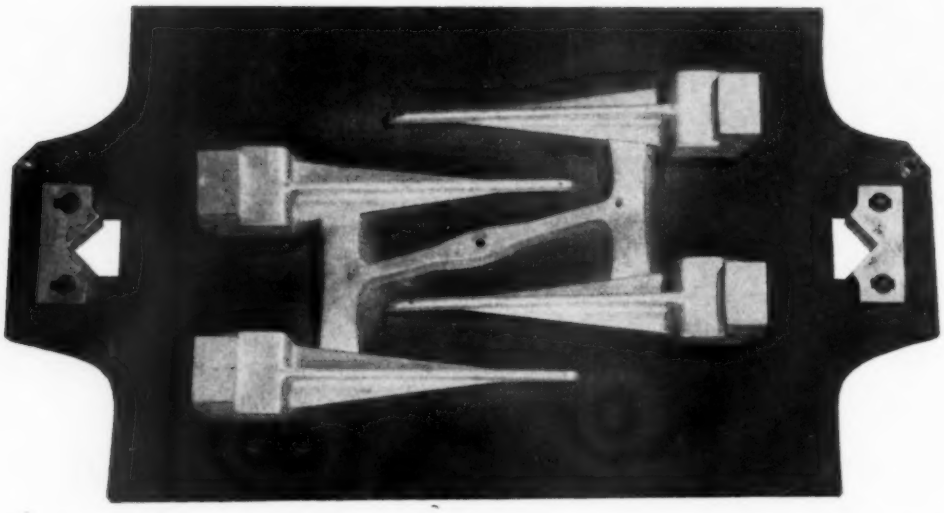
...American Optical Leggings and Spats

Available in three different materials for different types of hazards—Asbestos, Fire-Resistant Duck, Chrome Leather—the American Optical Company line of leggings and spats provide maximum possible protection and comfort.

AO wrap-around leggings, as shown in large illustration above, are light in weight, trim fitting,—yet very sturdily built. They provide a wide range of adaptability . . . are double-stitched for double-strength . . . reinforced at all vital points. Tempered steel stay arrangement slips easily into notch, allows quick removal. Tucks at top give snug fit and keep out splashes of metal.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

LIGNOLITE
PATTERN PLATES



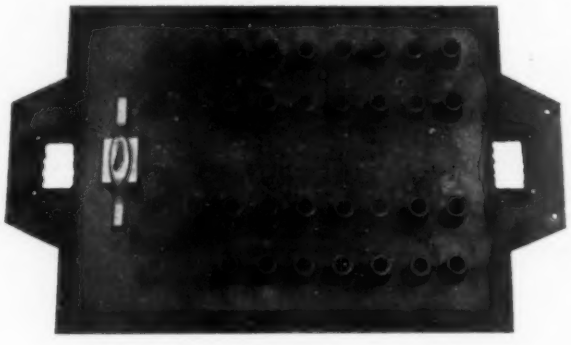
- FLAT
- UNIFORM CALIPER
- LIGHT WEIGHT
- HIGH STRENGTH
- EASILY MACHINED
- MOISTURE RESISTANT

CARRIED IN STOCK AND DISTRIBUTED BY

ADAMS & NELSON COMPANY
4125 Fullerton Avenue, Chicago, Illinois
BARADA & PAGE, INC.
2812 Center Street, Houston, Texas
M. A. BELL COMPANY
217 Lombard Street, St. Louis, Missouri
COMBINED SUPPLY & EQUIPMENT CO., INC.
215 Chandler Street, Buffalo, N. Y.
FREEMAN SUPPLY CO.
1152 E. Broadway, Toledo, Ohio
E. R. FROST COMPANY, INC.
1406 Quincy Street, Minneapolis, Minn.
GRANT & COMPANY
2144 E. 7th Street, Los Angeles, Calif.
GEORGE F. PETTINOS, INC.
1206 Locust Street, Philadelphia, Pa.
PRODUCTS ENGINEERING COMPANY
319 East Clybourn St., Milwaukee, Wisc.
WATERSTON'S
28 East Larned Street, Detroit, Mich.
WESTERN FOUNDRY SAND CO.
1039 Elliott Avenue, West Seattle, Wash.
In Canada:
GEORGE F. PETTINOS, (CANADA) LTD.
42 James Street, South Hamilton, Ont.

STANDARD SIZES—HOW TO ORDER

Available in all flask sizes, 3/8" to 2" thick. Standard plates are octagonal in shape with 1" allowance for flask and 2½" allowance for ears. Sheets are also available for own cutting. Sizes are 46" x 46" for thicknesses from 3/8" to 1½" inclusive; 40" x 40" for thicknesses over 1½". Please write for sample and complete information.



MARATHON CHEMICAL COMPANY
DIVISION OF MARATHON PAPER MILLS COMPANY
ROTHSCHILD **WISCONSIN**

Amazing Progress!

Note the amazing progress in plane and tank construction since World War I. In this period of time, MILWAUKEE MOLDERS have made a similar progress, and are, in a measure, responsible for the tremendous increase in the production of war equipment.

Typical Fighter Plane of World War I.

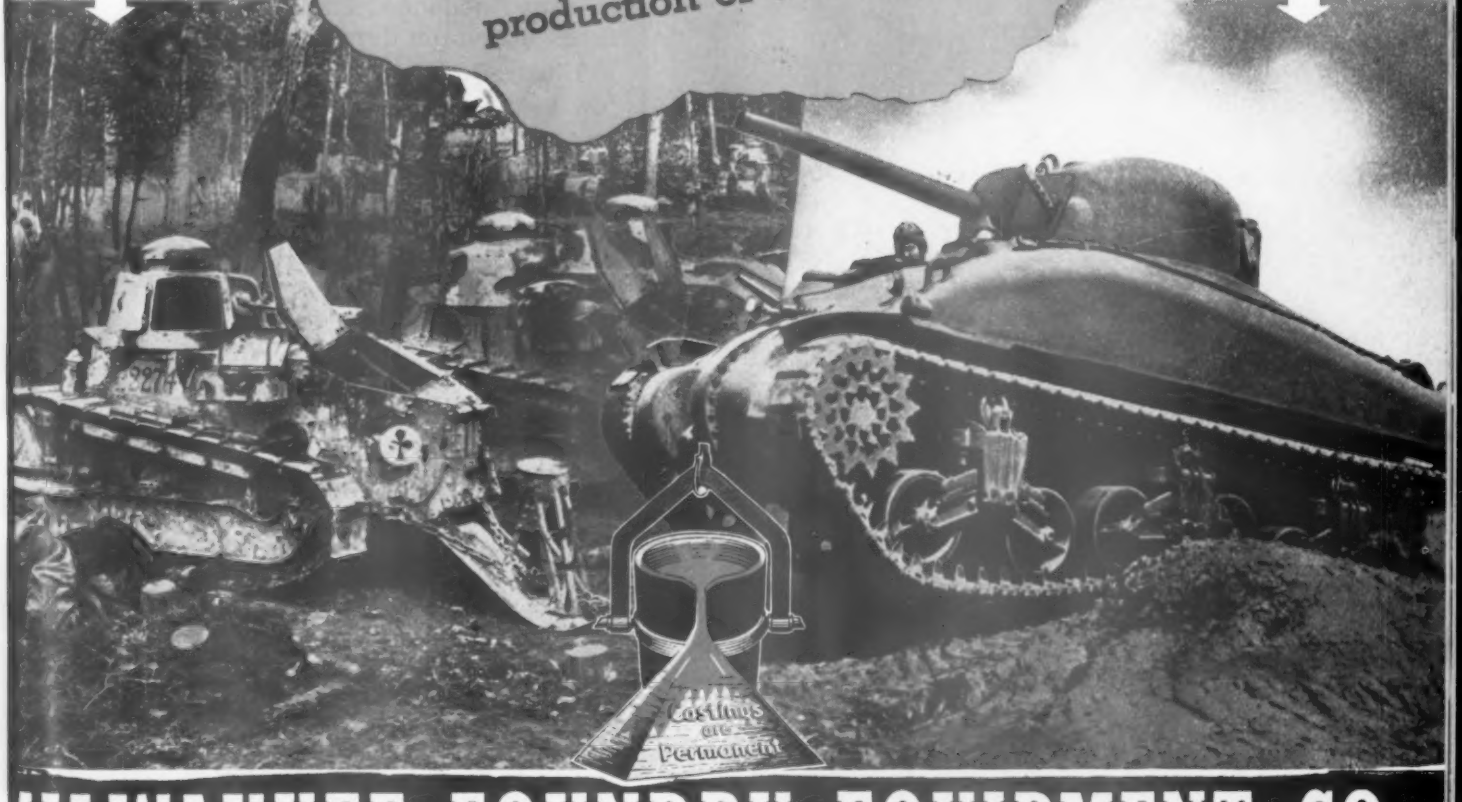
1918

S. Army Tank in the oods of Northern France.

Modern Bombing Plane Soaring through the Sky.

1943

Present Day Tank — Official U.S. Army Photograph.

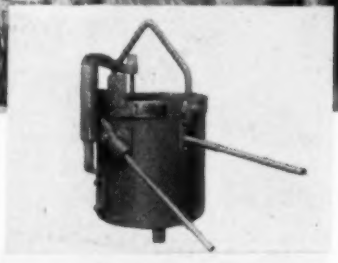


MILWAUKEE FOUNDRY EQUIPMENT CO.

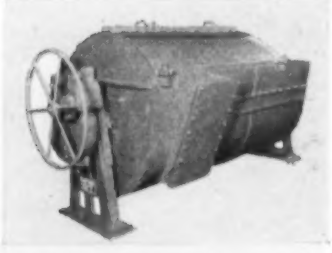
238 WEST PIERCE STREET • Cable Address "MILMOLDCO" • MILWAUKEE, WISCONSIN

Extra Convenience Longer Life Built into LADLES by Whiting

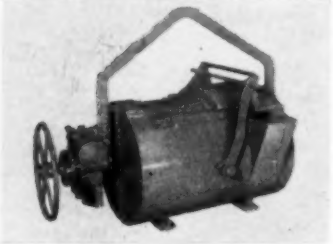
Geared crane ladle.



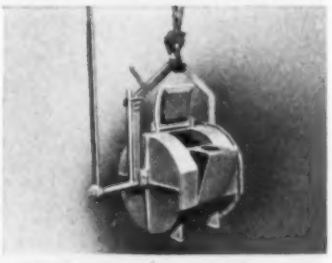
Special bottom-tap ladle.



Desulphurizing U-ladle, geared.

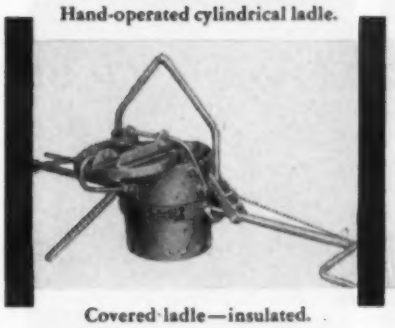


Cylindrical distributing ladle.

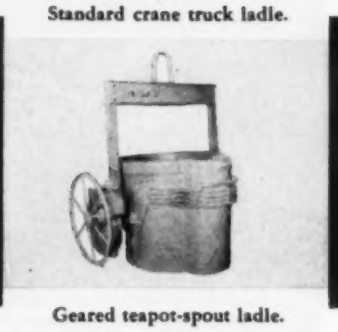


Hand-operated cylindrical ladle.

Standard crane truck ladle.



Covered ladle—insulated.



Geared teapot-spout ladle.

Whiting Ladles are designed by practical foundrymen to meet the requirements of efficient foundry operation. As a result of nearly sixty years of intimate service to the industry, understanding its needs and pioneering important developments, Whiting has designed ladles that incorporate every facility for safe handling and easy maintenance. Their construction affords maximum durability.

Illustrations on this page show only a few of the many available styles—ranging in capacity from 30 lbs. to 40 tons. From Whiting you can secure whatever type of ladle equipment is best suited for your operations, and be assured of the utmost in convenience and serviceability. Let Whiting supply your ladle needs. Send for Catalog #229. Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

ARMY E NAVY

WHITING

LADLES

CUPOLAS • FURNACES • CHARGING EQUIPMENT

THE *Strongest* BONDING CLAY IN AMERICA

DIXIE BOND

★ *Highest Green Strength*

★ *Highest Permeability*

★ *Highest Flowability*

★ *Easy Shake-out*

★ *Clean Castings*

★ *Easy to Mix*

★ *Moderate Dry Strength*

★ *Moderate Hot Strength*

In your own interest, Mr. Foundryman, please check the list of qualities at the left. Notice our oft-proven claim that Dixie Bond is the strongest bonding clay in America. High flowability, easy mixing, and easy shake-out also mean much to you. So does moderate dry strength.

If these are the characteristics you need, then Dixie is the one *right bond* for you. If not, note the five products named below, which round out the ECP line. These, alone or in combination, cover just about any set of conditions you can have. *No one bonding clay can do all jobs equally well.*

ECP's practical advice and on-the-spot service are yours to command.

EASTERN CLAY PRODUCTS, INC.
EIFORT, OHIO

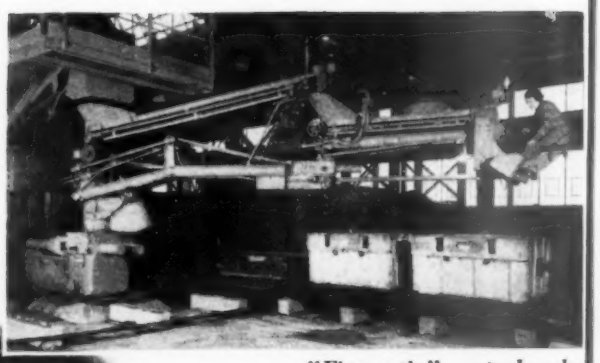
DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO

ECP *All* TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

SAVE MANHOURS—

with the B&P Speedslinger



"Finger tip" control makes Speedslinger operation so easy women like it.

THE Speedslinger operator rides comfortably with the ramming unit directly over the work. View of the flask is unobstructed. Physical exertion consists only of push button controls for sand flow, machine travel, etc., and finger tip "joy stick" control of the direction of motion of the ramming unit.

FLOOR SPACE—METAL

The MOST ADVANCED RAMMING METHOD IN USE TODAY . . . . . .

The Speedslinger is a simple, rugged, hydraulically controlled, sand ramming machine, which can be operated by either a man or woman operator without previous foundry experience. It practically eliminates labor fatigue—and, solves the problem of manpower shortage, skilled or unskilled, by releasing men for other work.

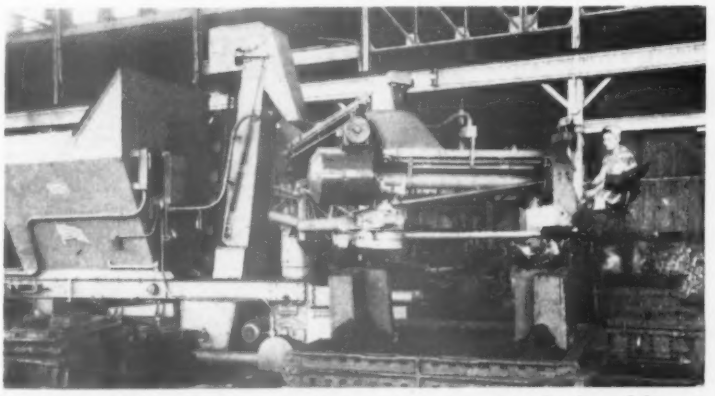
Faster ramming means faster mold output. Molds are rammed in minutes where the hand filling and air ramming method often requires hours. Because of its versatility and sand-ramming speed, the Speedslinger will vastly increase mold production from your present floor space.

The Speedslinger also saves metal. It rams hard and uniformly—eliminating swells and overweight, resulting in great saving in finishing time. In many cases the saving in metal alone has paid for the Speedslinger in less than a year.

It will pay you to investigate the application of the Speedslinger to your work. Beardsley & Piper engineers are ready to show you without obligation how to make better molds, more molds at lower cost.

The Speedslinger rams molds faster, harder and better than ever before.

Inexperienced foundry help learn to operate the Speedslinger with only a few hours' instruction.



Whether molds are large or small, simple or complex, the Speedslinger will make them much faster, better and at far lower cost.

THE BEARDSLEY & PIPER COMPANY B&P "BETTER METHODS"

WRITE FOR BULLETIN!

THE BEARDSLEY & PIPER COMPANY

2541 North Keeler Avenue — Chicago 39, Illinois

A *Real* INVESTMENT FOR MORE PRODUCTION!

DIAMOND FLASKS

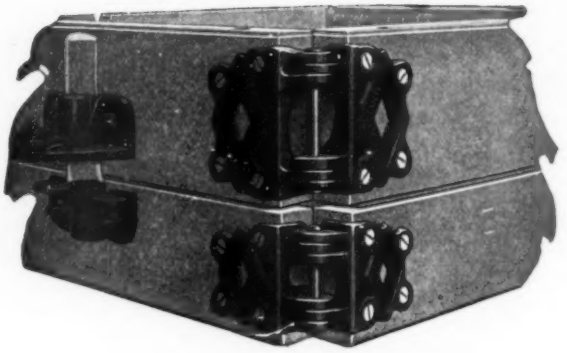
No matter what happens—you'll never be wrong if you equip for production with *good* flasks. Because we can give you many exclusive features in a flask developed over a period of 50 years, it can also be said that, "You can't go wrong on a Diamond," either. Note these important features:

- **A SUPERIOR LATCH (exclusive)**

  It's self-compensating for wear. The tighter you draw it, the firmer the grip. Has special cam which is easily adjustable as extreme wear on parts develops. Only *Diamond* has this patented feature.

- **PRECISION-MADE**

  Made from the finest grade of well-seasoned cherry stock, all flasks are made to precise measurements according to your specifications.



- **A PATENTED HINGE (exclusive)**

  Note the construction of Diamond hinges. The lugs are carefully milled and are interlocking which eliminates "play" no matter how long or how hard the flask is used.

- **SPECIAL SHAPES**

  We regularly supply customers with special shape flasks, including round flasks, and special cut partings.

STEEL JACKETS

Made from Nos. 7 to 10 gauge steel, true to size and taper. Are practically indestructible, and retain their shape under severest conditions. Thousands of these jackets in use.

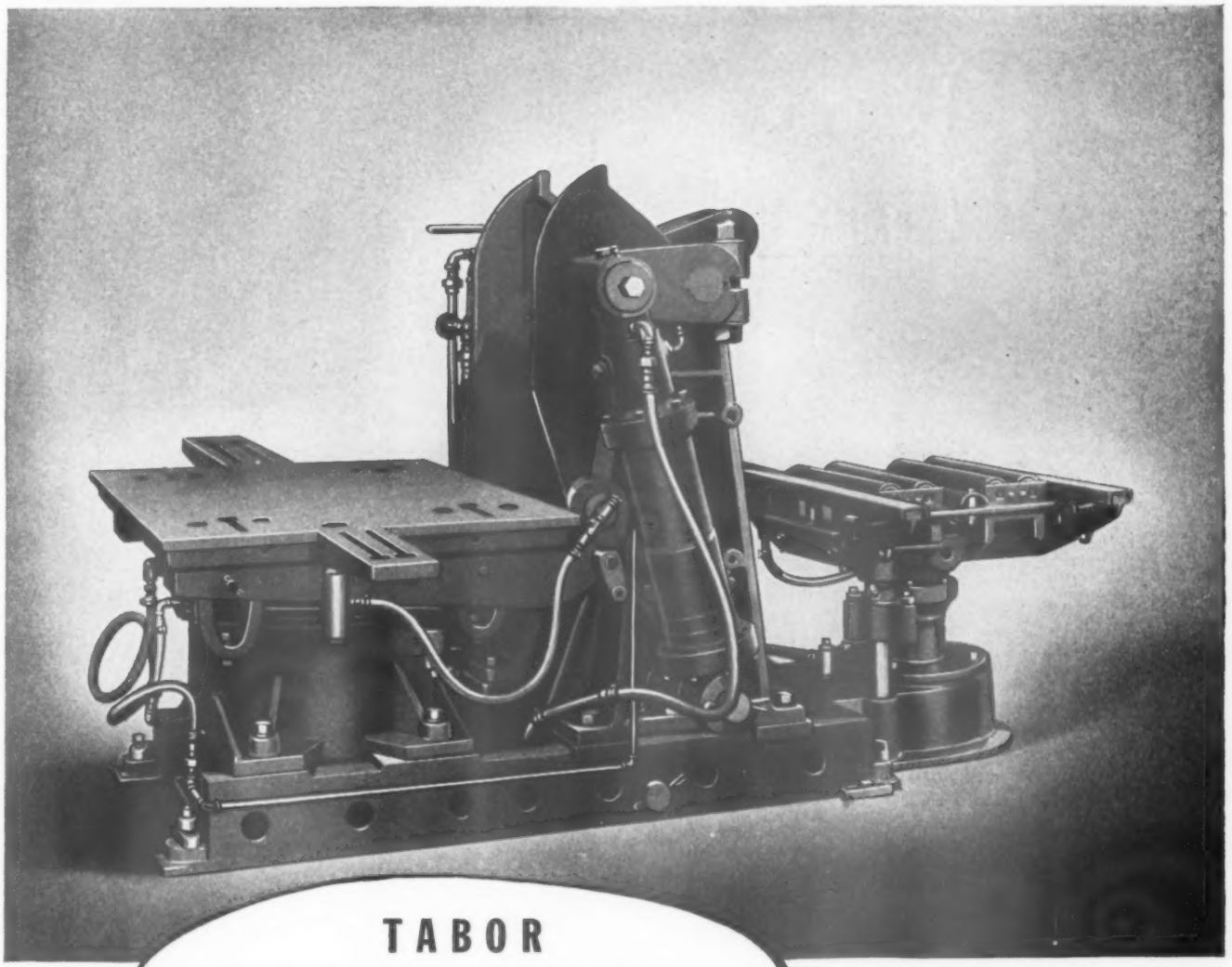
DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

TABOR FOUNDRY MOLDING MACHINES



TABOR JAR ROLLOVER PATTERN DRAW MACHINES

▲ 36" Plain Jar, Power Rollover, Power Draw Machine. 15" Draw. Capacities to 2900 lbs.

Tabor machines handle jobs up to their full rated capacity in 35 seconds or less for a complete operating cycle. Ramming time is reduced to a minimum by the efficient Tabor jarring member . . . Rollover is oil controlled for maximum speed with absolute safety . . . Automatic leveling device handles any load with no possibility of shift . . . Draw is smooth at any desired speed by air-on-oil, and is accurate throughout the life of the machine.

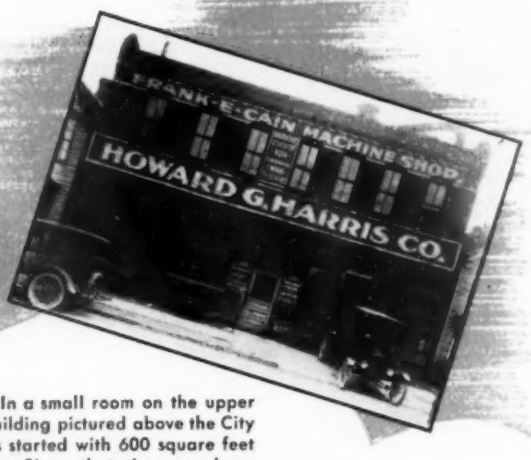
Tabor Jar Rollover Pattern Draw Machines are furnished in all practical sizes; plain-jar or shockless-jar; with or without air-operated flask clamps; stationary and portable types. Bulletin 424 illustrates and describes the complete line.

TABOR
TRADE 1884 MARK

THE TABOR MANUFACTURING CO.
6225 Tacony Street
Philadelphia 35, Pennsylvania

Representatives: Snyder Foundry Supply Co., *Los Angeles, Calif.;* Pacific Graphite Works, *Oakland, Calif.,* Carl F. Miller & Co., *Seattle, Wash.*

30 YEARS OF SERVICE



August 1913. In a small room on the upper floor of the building pictured above the City Pattern Works started with 600 square feet of floor space. Since that time, we have steadily increased in size until today we have approximately 49,500 square feet.

Thirty years of service to a land we love to serve.

Yes, thirty years of service to a wartime as well as to a peacetime America.

Through world war number one, through the boom period and through the depression that followed we have steered a steady course, conservative, healthy, financially sound and consistent.

Throughout this period of steady advancement and growth we made service our watchword and expanded our facilities at every opportunity with an eye to the future and the best interests of those we served.

All this the good old City Pattern Works did well.

Since that warm Labor Day in September, Nineteen Thirteen when Vaughan Reid and Fred Coulton worked and sweated in their undershirts assembling their meager equipment and up to the present time, quality, precision and performance have kept pace with our steady enlargement of program and facilities.

H. A. Kelley came with us early in Nineteen Twenty-Four and today is General Sales Manager. He has been responsible to a major degree for many of the valuable contacts that have lasted through the years.

Art Bossert joined us in April 1927, and now is General Superintendent in charge of Production.

The President's son, Vaughan C. Reid, joined the Company in late Nineteen Thirty-Three and at present has charge of Research and Metallurgical Activities.

After much thought and discussion we have decided that our name should be more descriptive of our various products and services. Therefore, after thirty years of sincere strenuous effort we are now rededicating ourselves and all we have and hold to an even greater effort and responsibility to the future and we shall be known hereafter as City Pattern Foundry and Machine Co.

May we be blessed with the opportunity to serve our country and our many loyal friends for years and years to come.

WOOD AND METAL PATTERNS • KELLER AND DUPLICATOR WORK • MACHINE WORK • MALLORY METALS • BERYLLIUM COPPER • MONEL METAL • EVERDUR CASTINGS

COPPER CASTINGS OF HIGHEST ELECTRICAL CONDUCTIVITY

• • •

BRASS, BRONZE AND ALUMINUM CASTINGS

CITY PATTERN

FOUNDRY AND MACHINE CO.

1162 HARPER AVE. at RIVARD ST., DETROIT 11, MICH.

Fast Pouring
ON THE PRODUCTION FRONT!

Sterling patented features include: Integral ribs and flanges . . . all-welded construction . . . solid center reinforcing rib . . . square flanges . . . full-width bearing. Flasks are easy to shake out, simplifying accuracy and speed in molding. (Patent No. 1974292)

More than 3500 foundries of America, fighting against time in the battle for more production, employ sturdy, soundly-engineered Sterling Flasks. Typical is this Eastern steel foundry shown above . . . pouring from a bottom pour ladle into heavy-duty Sterling Steel Flasks . . . molds are easily made . . . production is stepped up. Consult STERLING for complete foundry flask service.

Sterling
FOUNDRY FLASKS

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

Radiating Far Beyond the Magnetic Field of Magnaflux

—An Industry-Wide Area of Service

● Foundry men, who have recently learned of Magnaflux through conversion to war production, have a variety of ideas about it. They think of a piece of equipment, or of lines revealing cracks (as in the piston above)—or a can of Magnaflux Paste. These are only parts and details of a method which can save a foundry from passing on defective castings—from allowing others to detect foundry flaws.

The whole picture is framed in the Magnaflux Corporation's comprehensive service to Industry in the field of non-destructive inspection. Fourteen years of research, development and education by the Magnaflux engineering staff have provided an unparalleled base of specialized knowledge about defects in metal parts. This experience is shared among all Magnaflux users by means of traveling schools, special bulletins, text books, centralized laboratory service and regular contacts by field engineers.

Intelligent engineering service—quick delivery—capable training are available through your nearest field engineering office.

MAGNAFLUX RESEARCH

Since the pioneering stage of the original Magnaflux Method for steel, our engineers have sought to extend the benefits of *rapid non-destructive* inspection techniques in every field. Special equipment and new procedures for more sensitive results have been developed. Magnaglo, recently announced, extends the usefulness of magnetic inspection. Zyglo is a new method of tremendous possibilities for the inspection of aluminum, magnesium and other non-magnetic and non-metallic materials.

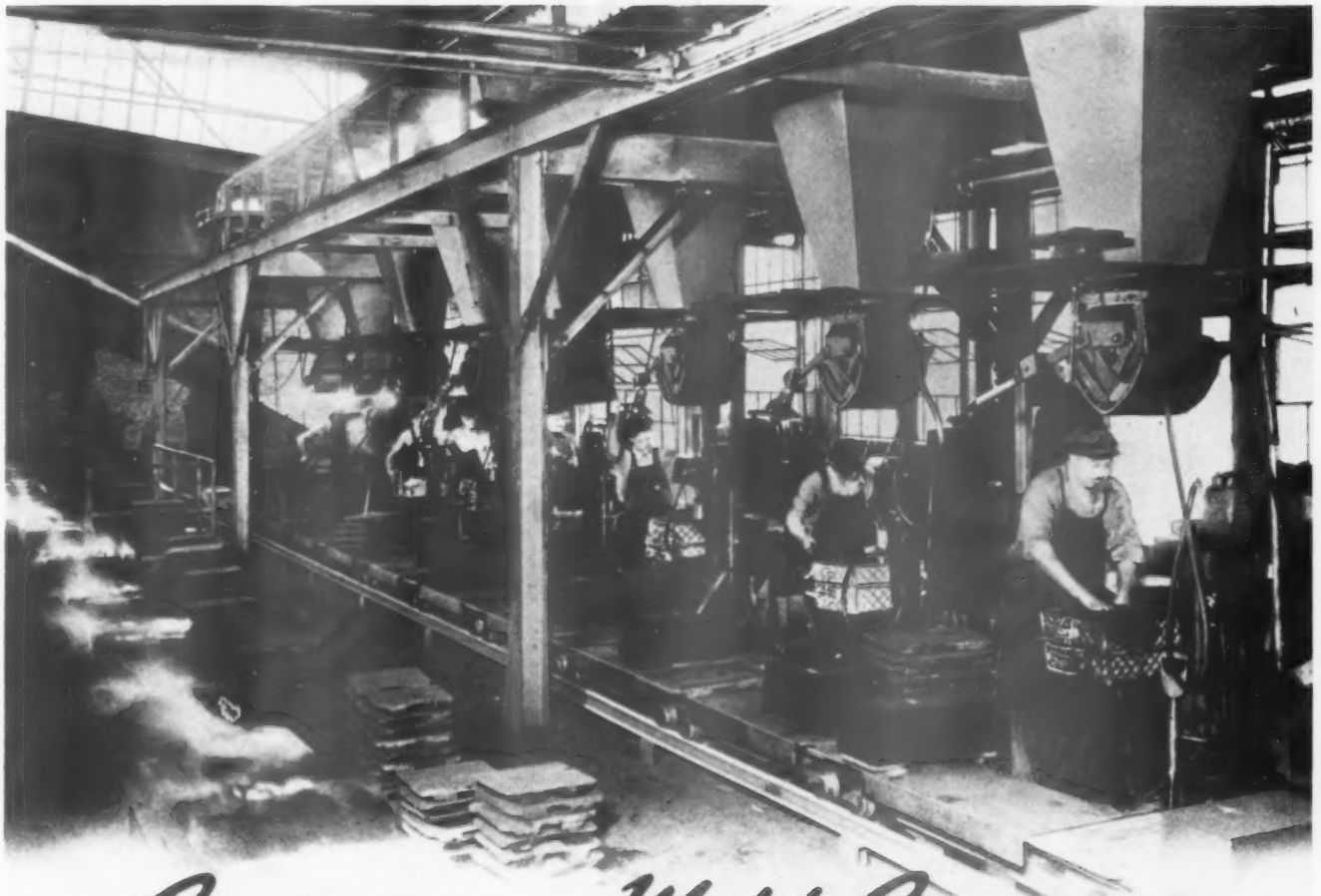
And still the laboratory looks ahead.

MAGNAFLUX CORPORATION

MAGNAFLUX CORPORATION

5908 Northwest Highway, Chicago 31, Illinois

NEW YORK • CLEVELAND • DETROIT • BIRMINGHAM • LOS ANGELES • DALLAS



Continuous Mold Conveyors

many types—for every requirement

● Bartlett-Snow Continuous Mold Conveyors provide foundry owners and managers with a means of securing a maximum of both quality and quantity from their plants. They permit sand to be reused three, four or more times a day . . . flasks can be used over again eight to twelve times each shift. Output per given floor space is much increased. "Overhead" is spread over a larger production resulting in a less costly more salable product.

Bartlett-Snow single axle two wheeled cars, and two axle four wheeled cars are available in a wide variety of types and sizes to meet the requirements of handling different kinds and classes of work . . . and the car tops can be fitted with gravity rolls if desired to facilitate the loading and removal of heavy molds.

Our recently completed 40-page Foundry Bulletin No. 91, which illustrates many different applications of "run-around" mold conveyors and other Bartlett-Snow Foundry Equipment, contains much information of interest to every foundryman. Send for a copy!

THE C. O. BARTLETT & SNOW CO.

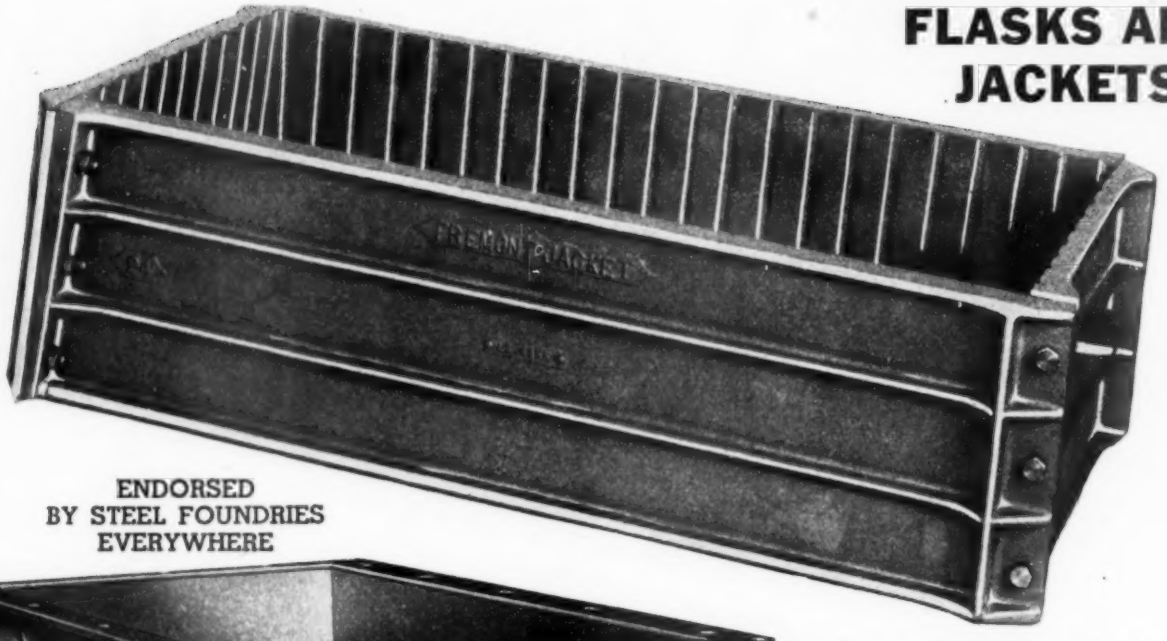
6201 HARVARD AVENUE • CLEVELAND, OHIO

Engineering and Sales Representatives in the Principal Cities

FOUNDRY SAND, MOLD AND CASTINGS HANDLING • • DUST AND FUME CONTROL SYSTEMS • •

EFFICIENCY AND LONG LIFE PLUS LIGHT WEIGHT .... IN FREMONT

FLASKS AND JACKETS



ENDORSED
BY STEEL FOUNDRIES
EVERYWHERE

FREMONT FLASKS and JACKETS have established a reputation for efficiency and long wear and in most progressive foundries have replaced old type, cumbersome, heavy weight equipment.

FREMONT JACKETS have special ribs to permit escape of gas from the mold. Standard jackets are furnished with or without ribs. "Ribbed jackets" should be specified when ordered.

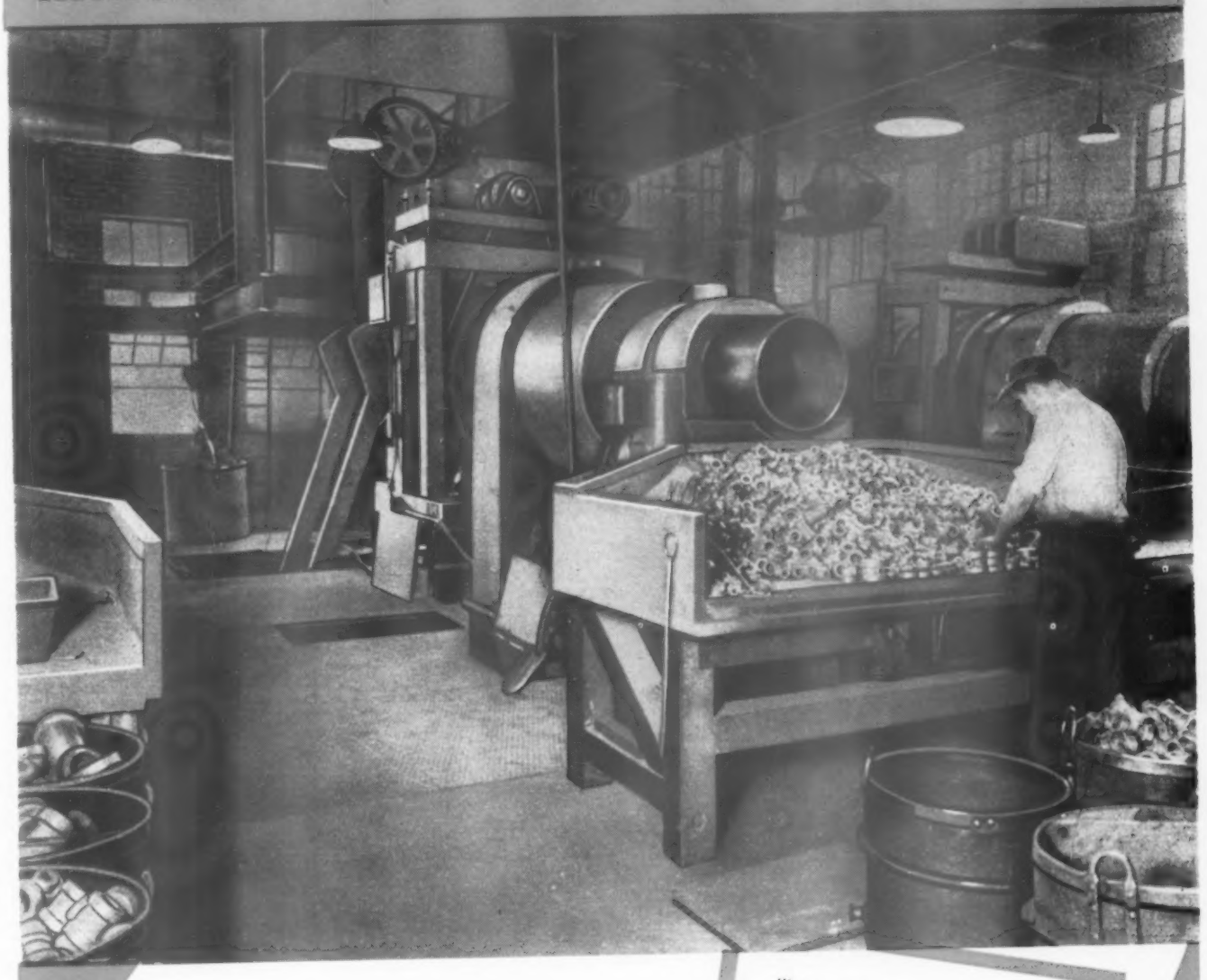
The FREMONT FLASK with the 1" GROOVLOCK PIN is especially adapted to snap work but can also be furnished with cast ears to accommodate standard pins.

Slip Flasks FREMONT GROOVLOCK Jackets

THE FREMONT FLASK CO...FREMONT, OHIO

RANSOHOFF CLEANING MILLS

SAVE 30% TO 70% ON YOUR CLEANING COSTS



Faster Cleaning Over Here Helps Faster Cleaning-Up Over There

RANSOHOFF WET CLEANING MILLS IN YOUR PLANT are an important link in the chain of processes which enable you to increase production while shaving down costs. They're speedy . . . economical . . . gentle . . . not self-destructive . . . and provide automatic handling of stars.

The patented method of handling the cleaning material is automatic sending it into the cleaning compartment when a batch is charged, separating it from the work automatically when the cleaning operation is finished. The work rolls in the mass and pressure is equal from all sides. The entire surface of each casting is cleaned. Sharp corners are preserved and delicate designs in relief or indentation are left sharp and distinct.

YOU CLEAN MORE IN LESS TIME.

Illustration shows one of an installation of 3 60" x 72" End-Loading, End-Unloading wet cleaning mills with power loaders which extend below floor level. Mills discharge directly on sorting tables. Work is brought to the mills in buckets suspended from monorail and is dumped into the loading skips. All three mills are served by one circulating pump and sand conveyor. Work is charged without shake-out so sand conveyor and circulating system dispose of sand adhering to castings as well as the core sand.

WRITE FOR THE NEW RANSOHOFF CATALOG
32 pages of practical ideas

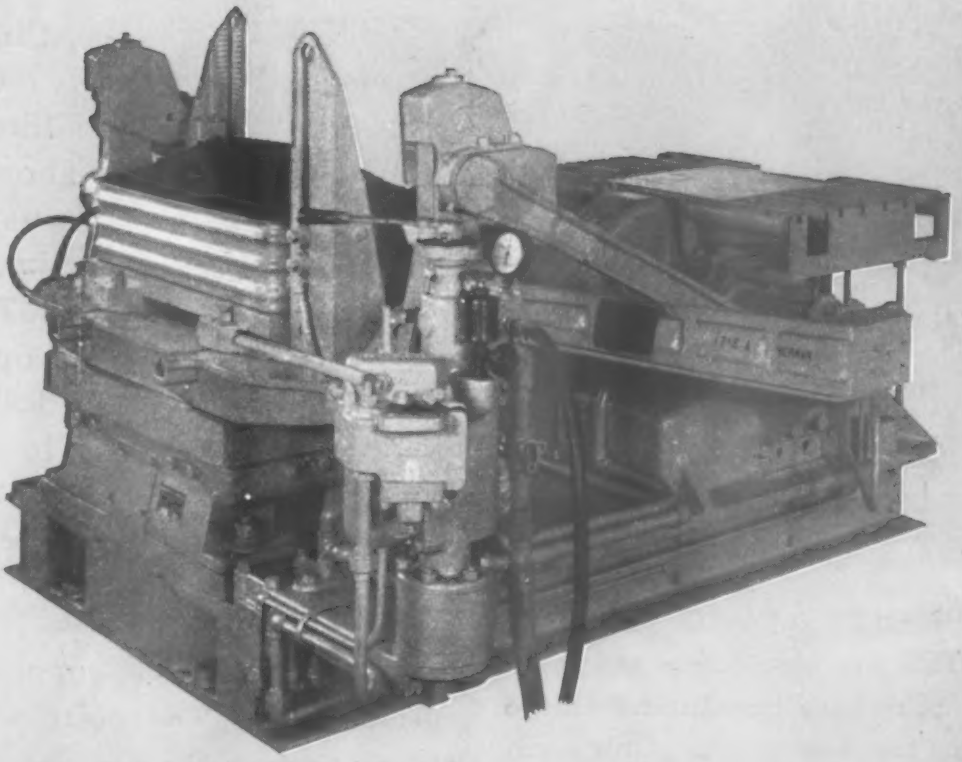
N. RANSOHOFF INC

TOWNSHIP AND BIG FOUR R. R. CINCINNATI, O.

"for meritorious achievement"

August, 24, 1943

HERMAN

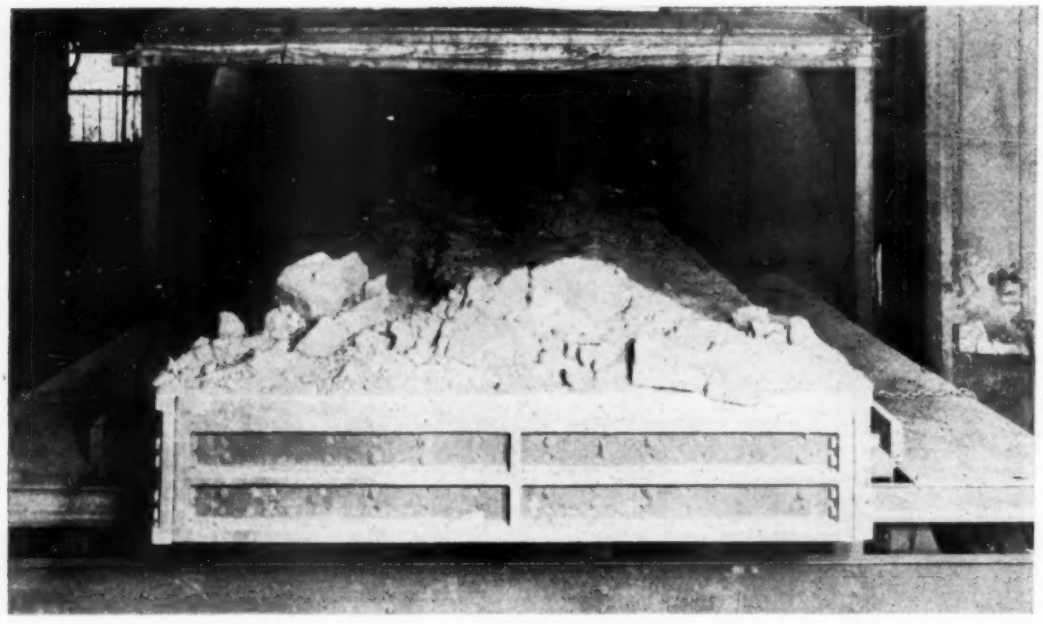


HERMAN MOLDING MACHINES MEET EVERY WAR PRODUCTION MOLDING PROBLEM

HERMAN PNEUMATIC MACHINE COMPANY, PITTSBURGH, PA.

MOLDING MACHINES

Simplicity
QUAD SHAKE-OUTS
Do Giant's Work!



The Simplicity Quad Shake-Out, shown by cut, was installed in August, 1937, and has operated daily under loads up to 130,000 pounds

SIMPLICITY QUAD SHAKE-OUTS are operating today in many foundries producing large castings for war work. One such job is the unit cast tank hull, which with flask and sand weighs around 170,000 pounds. The flask is shaken out and the core sand knocked out of the hull casting in the total elapsed time of only ten minutes.

Quad Shake-Outs have been built in sizes ranging from 10′ x 10′ to 15′ x 22′ in vibrating area. Special deck areas can be supplied for special jobs. The positive blows struck against the flask or casting by the massively constructed vibrating units assure fast and certain movement of the sand, no matter how hard it is baked.

Our engineering representatives will check your job and recommend the proper equipment.

"Purchase Shake-Out Certainty and Assured Service"

Simplicity Engineering Company

DURAND, MICHIGAN

For Canada: Waterous Limited, Brantford, Ontario

ON 90% OF YOUR JOBS THESE SPO's WILL FILL YOUR NEEDS . . .

SPO No. 100 Series Jolt Squeezer Machines, CANTILEVER Type.

SPO No. 100 Series Jolt Squeezer Machines, POST Type.

SPO No. 200 Series Jolt Squeeze Stripper Machines, CANTILEVER Type.

SPO No. 200 Series Jolt Squeeze Stripper Machines, POST Type.

SPO No. 300 Series Jolt Stripper Machines.

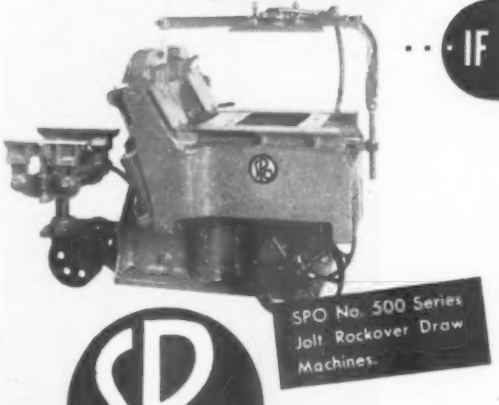
SPO No. 400 Jolt Squeeze Rockover Draw Machines.

● Each of these illustrations stands, not for just one machine, but for a group of machines. They are all flexible and versatile. There are other series, also, in the SPO line.

Just what do *you* need? Equipment for short or long production: for light, semi-heavy or heavy work; or perhaps an all-around performer that does a little of everything well? It's all here — with a good profit in every instance.

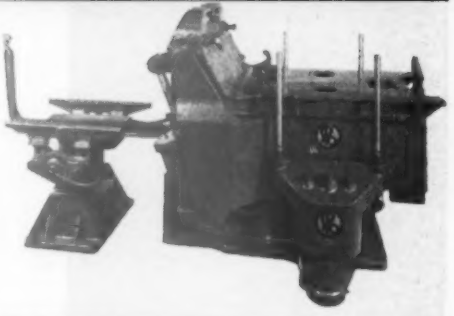
BUT — we don't try to make even the broad-based SPO line straddle all foundry pictures. Many situations are served better by variations in design — by changing or combining features or by devising new ones. We have ample design facilities to give you the *one* right set-up for your purpose — facilities based upon many years' experience as practical foundrymen.

. . . IF THEY DON'T, WE'LL *Build* YOU ONE THAT WILL



SPO No. 500 Series Jolt Rockover Draw Machines.

Specially tailored to your measure, this SPO molding machine is a modification of the No. 500 Series. It has a stripping feature incorporated for green sand core work.



SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE . . CLEVELAND 5, OHIO

FANNER CHAPLETS

Whatever your CHAPLET requirements may be, there is a FANNER CHAPLET to fit the job.

THE FANNER MANUFACTURING COMPANY, CLEVELAND, O.

THE CANADIAN FANNER LTD., HAMILTON, ONTARIO, CANADA

WEAPONS FOR PRODUCTION...

Carborundum Brand Products

IT really does not take much imagination to understand the tremendously important part that abrasive and refractory products by Carborundum are playing in the war effort.

For instance, there isn't a single implement of warfare, from the big guns of the battle wagons to the optical lenses of range finders, that does not require grinding at some stage in its production.

Cranks for Diesel engines as well as all of the extremely accurate parts of the airplane engine, the truck and jeep motors, must be ground. Shells and projectiles just couldn't be produced with speed and accuracy without grinding.

The grinding wheel and grinding methods help to make possible the mass production of tanks, ships, machine guns, rifles and the millions of castings and parts that go to make up the machines of war.

The cutting action of milling cutters, reamers, drills, broaches, hobs, taps, dies and other metal fabricating tools depends upon their being properly, skillfully ground.

The castings and other parts of thousands of machine tools must be ground and miles upon miles of coated abrasive products are necessary in the finishing and polishing of all types of metals.

Super refractory products by Carborundum are also doing their part in making possible the more efficient operation of heat treating, ceramic and boiler furnaces and also hundreds of chemical and metallurgical processes.

These products are "Weapons for Production". Use them wisely to conserve strategic materials and thus hasten the Day of Victory.

CARBORUNDUM ABRASIVE PRODUCTS

REFRACTORY CARBORUNDUM PRODUCTS

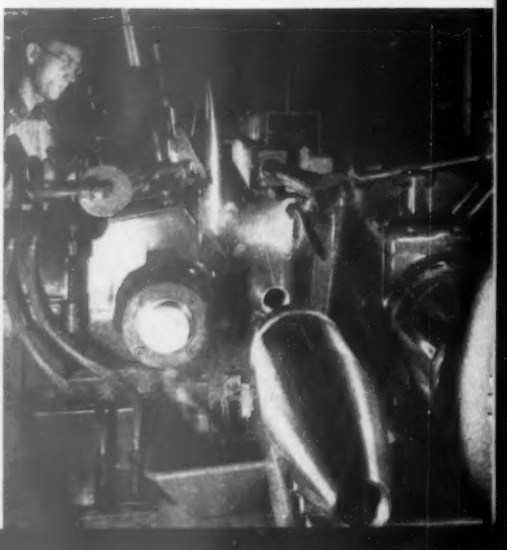
THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

REG. U. S. PAT. OFF.

MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

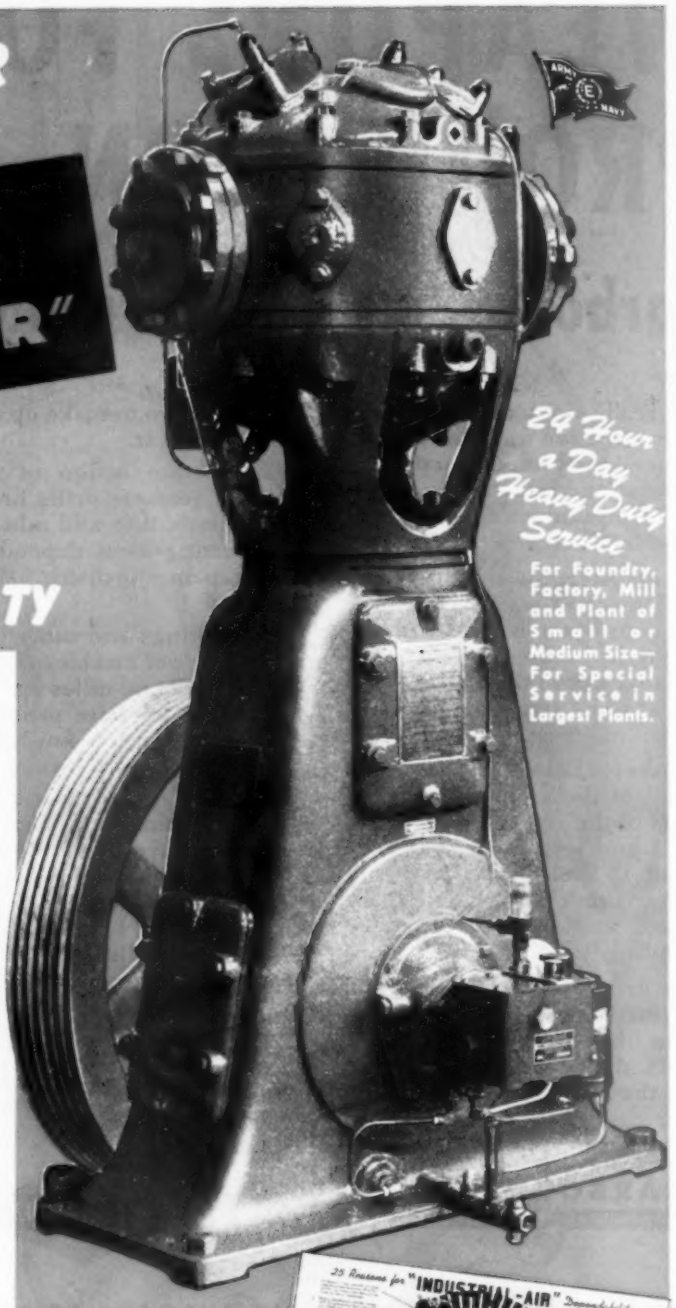
(Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company)



THE AIR COMPRESSOR FOR HEAVY DUTY

SULLIVAN "INDUSTRIAL-AIR"

...WITH 25 Reasons FOR GREATER DEPENDABILITY



24 Hour a Day Heavy Duty Service

For Foundry, Factory, Mill and Plant of Small or Medium Size—For Special Service in Largest Plants.

● The same engineers, the same thinking, the same design, the same materials that produced the famous Sullivan PACKAGE TYPE COMPRESSOR—produced this Sullivan "INDUSTRIAL-AIR". It is performing in the same way. It is giving the same satisfaction. It is the only single-stage, double-acting compressor that gives you full force feed lubrication, replaceable cylinder liners and crosshead guides, anti-friction main bearings, the exclusive Sullivan "Dual-Cushion" Valves and greater capacity per foot of floor space. Made in eleven sizes with displacements from 153 to 822 C.F.M. and pressures from 30 to 150 lbs.

It has 25 important features of construction that add up to greater dependability, longer life, more air... features you *should* know... features told at length in Bulletin A-43. Get a copy from your Sullivan branch office today. SULLIVAN MACHINERY COMPANY, Michigan City, Indiana. *In Canada:* Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.

GET THESE *Facts*

Know the 25 construction features that produce greater dependability. Write for Catalog A-43 today.

SULLIVAN

AIR COMPRESSORS FOR EVERY PURPOSE

PRODUCTS

STATIONARY AND PORTABLE AIR COMPRESSORS FROM ¼ TO 3000 H. P., PNEUMATIC CASTING GRIPS, FOUNDATION BREAKERS, PORTABLE HOISTS, ROCK DRILLS.

OFFICES

Seattle	Portland	San Francisco	Los Angeles	Salt Lake City
Boston	Pittsburgh	Birmingham	Duluth	Scranton
New York	St. Louis	Knoxville	El Paso	Denver
Chicago	Detroit	Huntington	Butte	Dallas

This Pantograph Shoe of High-Chromium Iron Lasted 10 Years

TEN YEARS of sliding metal on metal is a severe test for any abrasion-resistant material. But that is the record of this pantograph shoe, the trolley contact for a mix car in a metallurgical plant. After 10 years the shoe made of about 27 per cent chromium iron is still in service. Shoes of other grades of hardened steel on the same job last four months.

Iron castings of 26-28 per cent chromium outperform other commonly used wear-resistant metals and alloys in applications involving extreme wear . . . particularly where there is considerable abrasion without undue shock. These castings are unusually easy to cast.

Castings of high-chromium iron have given outstanding service in dredge-pump liners, sludge-pump liners for oilwell drilling, equipment for coke crushing, screening, and conveying systems, and rock-handling equipment such as crusher jaw plates, crusher rolls, and chute liner plates.

High-chromium high-carbon irons are readily made in either the crucible or electric furnace by melting procedures customary for high-chromium steels. For information on their composition, heat-treatment, and physical properties, write for the booklet, *Abrasion-Resistant High-Chromium* Iron.

★ *BUY UNITED STATES WAR BONDS AND STAMPS* ★

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

The 12″-38″ Adams Jolt Squeezer, Portable Type

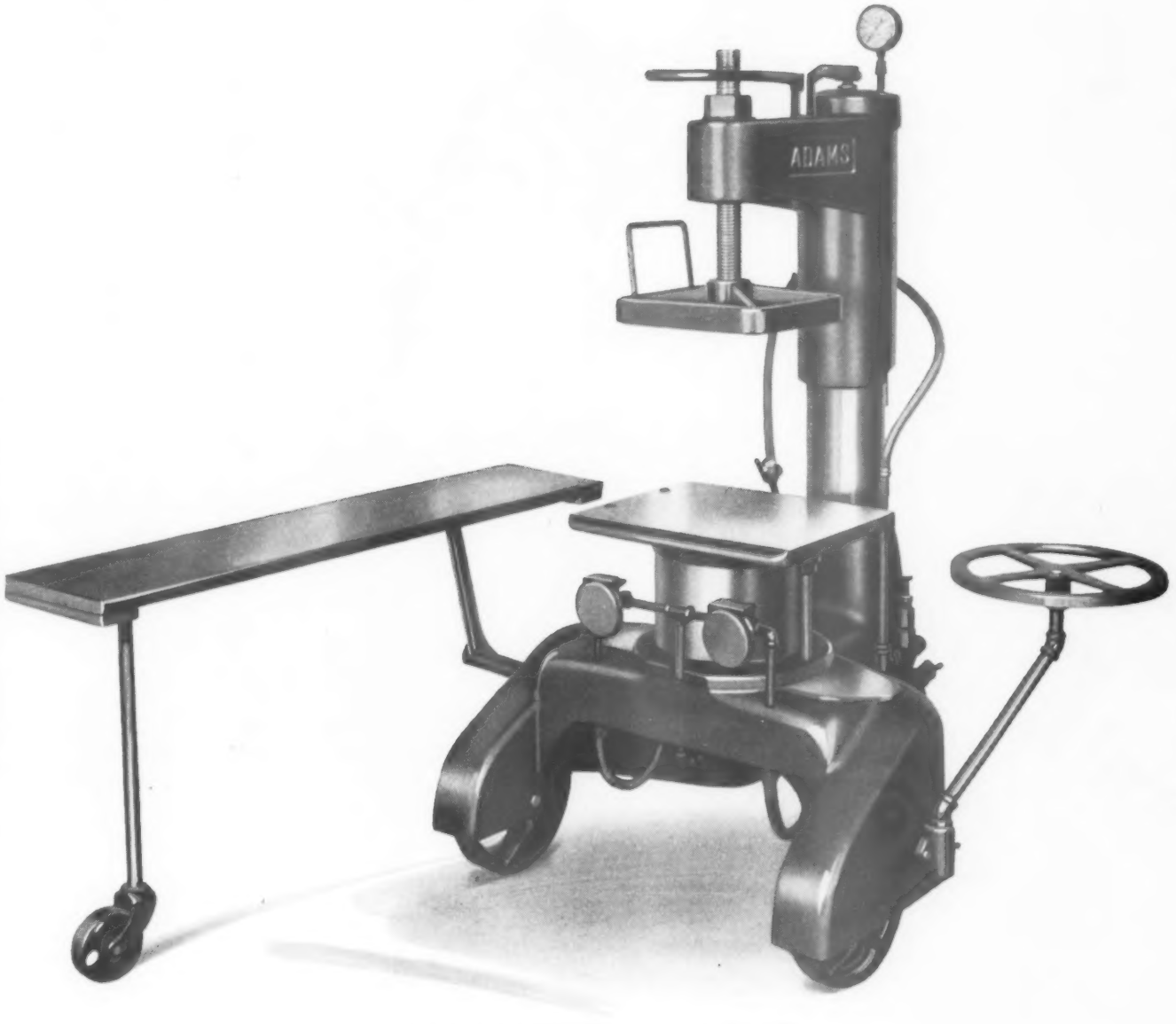
Make Your Selection From This List—

SIDE ROD TYPE PORTABLE OR STATIONARY	Squeeze Piston diameter	Jolt Piston diameter	Clearance between Side Rods	Pattern Draw, Adjustable
10″-32″ Jolt Squeezer	10″	4″	32″	
12″-38″ Jolt Squeezer	12″	5″	38″	
16″-42″ Jolt Squeezer	16″	6″	42″	
10″-32″ Universal Jolt Squeezer	10″	4″	32″	3″ to 6″
12″-38″ Universal Jolt Squeezer	12″	5″	38″	3″ to 6″

Also Adams Hand Squeezers—30″, 34″ or 38″ between side rods—Portable or Stationary.

THE ADAMS COMPANY

MOLDING MACHINES · FLASKS



The 10" Post Type Universal Squeezer, Portable Type

Adams Molding Machines

POST TYPE
PORTABLE OR STATIONARY

	Squeeze Piston diameter	Jolt Piston diameter	Pattern Draw, Adjustable
10" Post Type Jolt Squeezer	10"	4"	
12" Post Type Jolt Squeezer	12"	5"	
10" Post Type Universal Jolt Squeezer	10"	4"	3" to 6"
12" Post Type Universal Jolt Squeezer	12"	5"	3" to 6"

Also manufacturers of Snap Flasks, Slip Flasks, Jackets, Bands, Presser Boards, Bottom Plates, Upsets, Match Frames, Tubular Sprue Cutters and Vibrators.

Y · DUBUQUE, IOWA · U.S.A.

QUIPMENT Established 1883

Present you Non-Ferrous Melting and layout problems to Fisher today. Write for complete information.

In production as in product—formula determines results. In foundry practice—formula that results in both quality and quantity of production with maximum conservation of vital man hours, fuel and materials begins long before the consideration of temperatures, melting, alloying or casting operations. Modern foundry practice formula originates with the choice of equipment, plant layout and the co-ordination of equipment to the individual plant and production requirements.

Each of the bulletins illustrated above—each dealing with a specific branch of foundry operation—is a proven equipment formula that has been pioneered by Fisher and has been thoroughly proven to meet all of today's demands. Fisher has also pioneered in the principles, practices and plant layout studies that are proving indispensable in present-day demand for MORE QUALITY PRODUCTION.

Fisher's Non-Ferrous Metal Melting experience offers you (1) the benefit of many years of experience in foundry coordination and (2) a wide selection of melting furnaces including motorized, hand tilt, stationary and hydraulic types incorporating the latest mechanical and design features, with a capacity for every purpose.

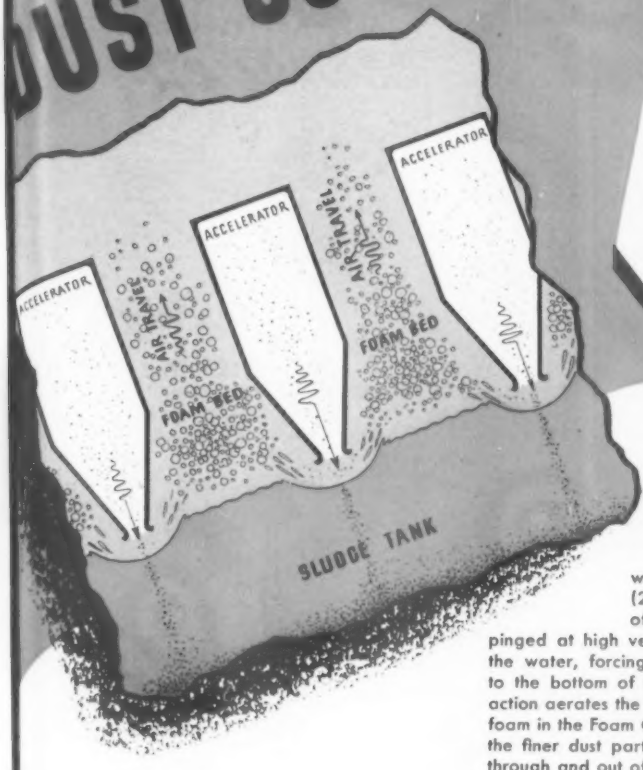
5519 N. WOLCOTT AVENUE, CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

"ENGINEERS AND MANUFACTURERS OF METAL MELTING EQUIPMENT"

MAHON *Hydro-Foam* DUST COLLECTORS

controls dust the SAFE way ..deposits it UNDER WATER

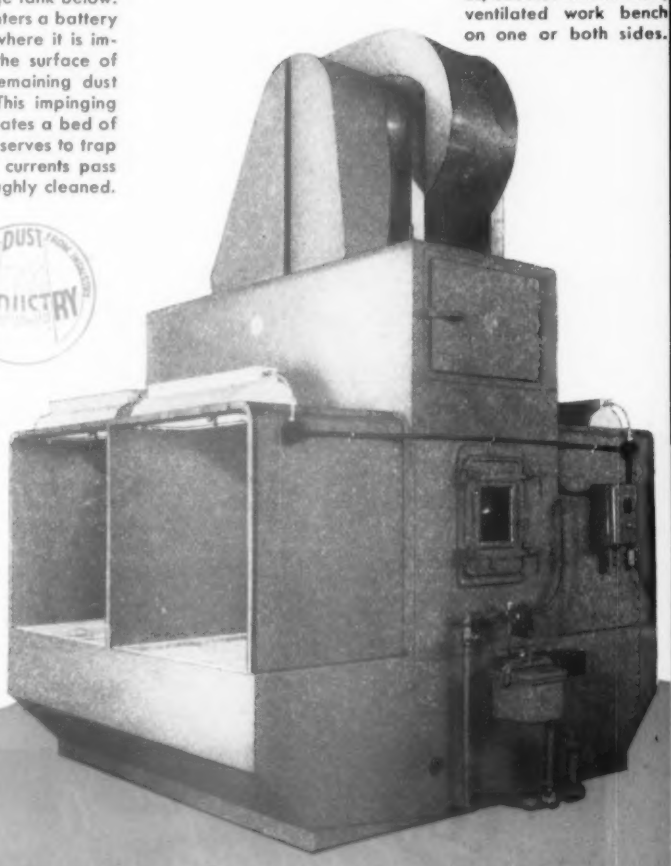


3-STAGE DUST ELIMINATION

(1) Dust-laden air is drawn into Intake Chamber where coarser particles drop by gravity into the treated water in the sludge tank below. (2) The air then enters a battery of Accelerators, where it is impinged at high velocity against the surface of the water, forcing most of the remaining dust to the bottom of the tank. (3) This impinging action aerates the solution and creates a bed of foam in the Foam Chamber, which serves to trap the finer dust particles as the air currents pass through and out of the unit, thoroughly cleaned.

Above: STATIONARY MODEL, where dust must be collected by means of hoods and ducts.

Below: PORTABLE MODEL, ductless with hooded, ventilated work bench on one or both sides.



No Pumps • No Cloth Screens • No Nozzles or Jets • Only ONE Moving Part — the Fan

Dust — trapped under water — can do no further damage. Magnesium alloy dusts—silica—abrasives—all *harmful* dusts, when wetted down, are put permanently out of circulation. This is the advanced principle upon which Mahon *Hydro-Foam* Dust Collectors operate—cleansing the air by a triple-process of elimination, as explained above. No pumps, cloth screens, nozzles or jets—only ONE moving part—the suction-exhaust fan. Mahon *Hydro-Foam* Dust Collectors are available in two types, portable and stationary. Manufactured in units of various capacities, used singly or in multiple to meet every industrial requirement. Write for descriptive folder.

THE R. C. MAHON COMPANY

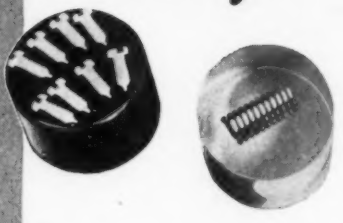
DETROIT CHICAGO

ers and Manufacturers of Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Systems, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—Including Complete Finishing Systems.

METALLURGICAL TESTING

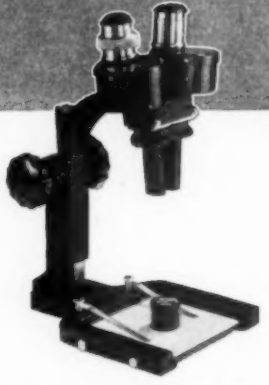
with speed and accuracy

● Specimen Polisher; vibrationless operation; selective speeds; sturdy construction, with maximum comfort and convenience in operation.



● Bakelite and Transoptic mounts made in AB specimen mount press.

● AB Multiple-Unit polishing table—for industrial production laboratories. Ample room is provided for each operator. May be supplied with either standard or low speed polishers.

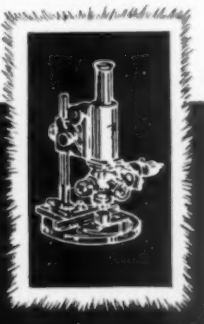


● Wide field binocular. Stereoscopic vision from 7X to 40X and up.

● AB Specimen Mount press—with solid heater and new design split cooling blocks that swing into position without releasing pressure on the mold. Built for speed, convenience and accuracy in molding specimens.

A complete line of equipment for the Metallurgical Laboratory

SPECIMEN MOUNT PRESSES — POLISHERS — POLISHING ABRASIVES — POLISHING CLOTHS — POWER GRINDERS — BELT SURFACERS — CUT-OFF MACHINES — HAND GRINDERS — CARBON METERS — COLORIMETERS — HARDNESS TESTERS — DUST COUNTERS — DILATOMETERS — EMERY PAPER GRINDERS — LABORATORY CHAIRS TITRATORS — MAGNIFIERS — METALLOGRAPHS — MICROSCOPES — STEREOSCOPES PYROMETERS — REFRACTOMETERS — SPECTROGRAPHS — MACRO CAMERAS

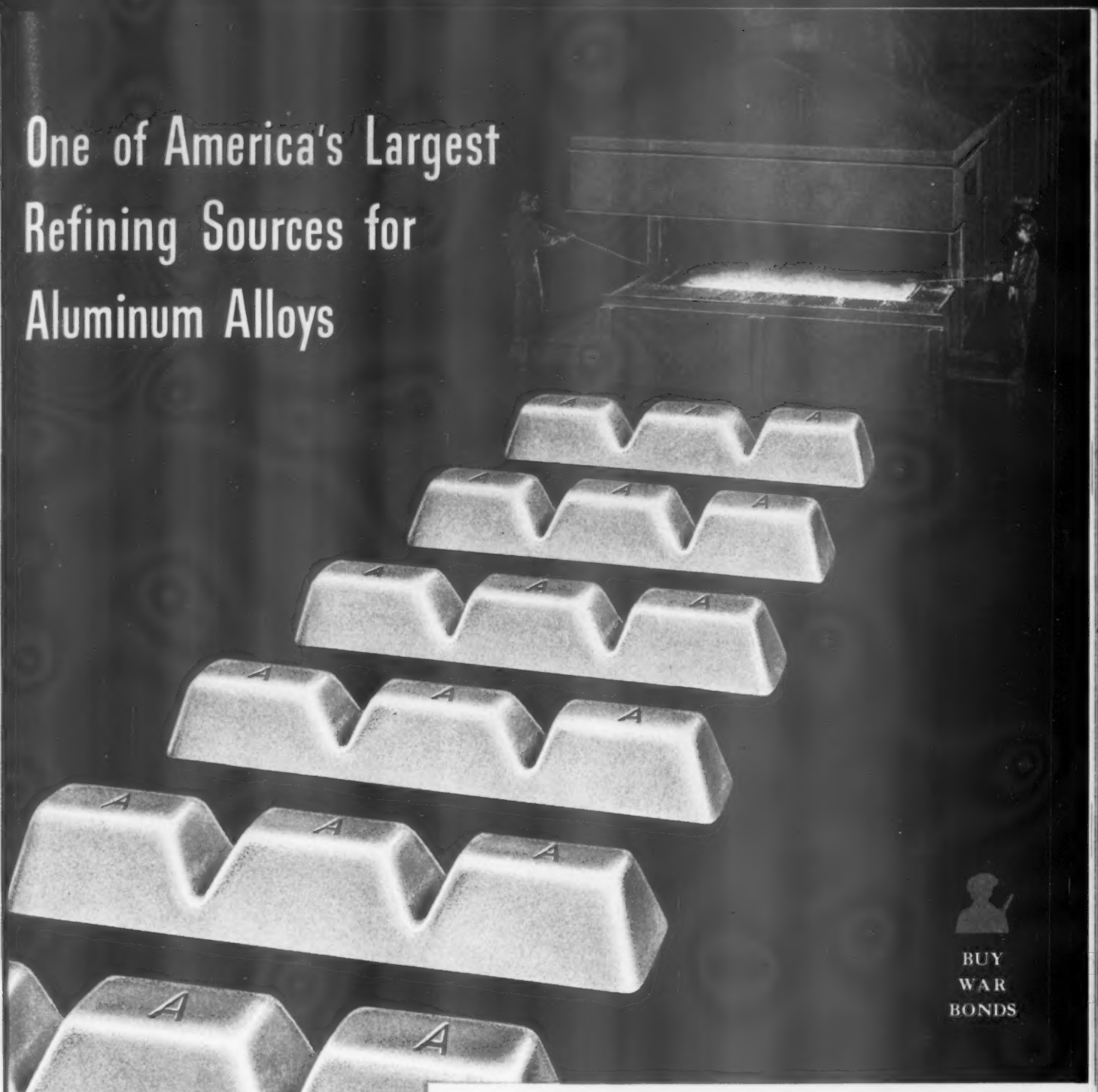


Adolph I. Buehler

OPTICAL INSTRUMENTS ★ METALLURGICAL APPARATUS

228 North LaSalle Street, Chicago, Illinois

One of America's Largest Refining Sources for Aluminum Alloys



BUY
WAR
BONDS

HERE you will find modern facilities and equipment which comprise one of the most complete refineries in the industry. The operating personnel possess a solid background of wide experience and a thorough knowledge of all casting requirements. Here are technicians who have spent years in the study and development of the most advanced aluminum alloys. When you need Aluminum Alloy Ingot consult—

Aluminum Refiners

Division of

BOHN ALUMINUM & BRASS CORPORATION · Detroit, Michigan

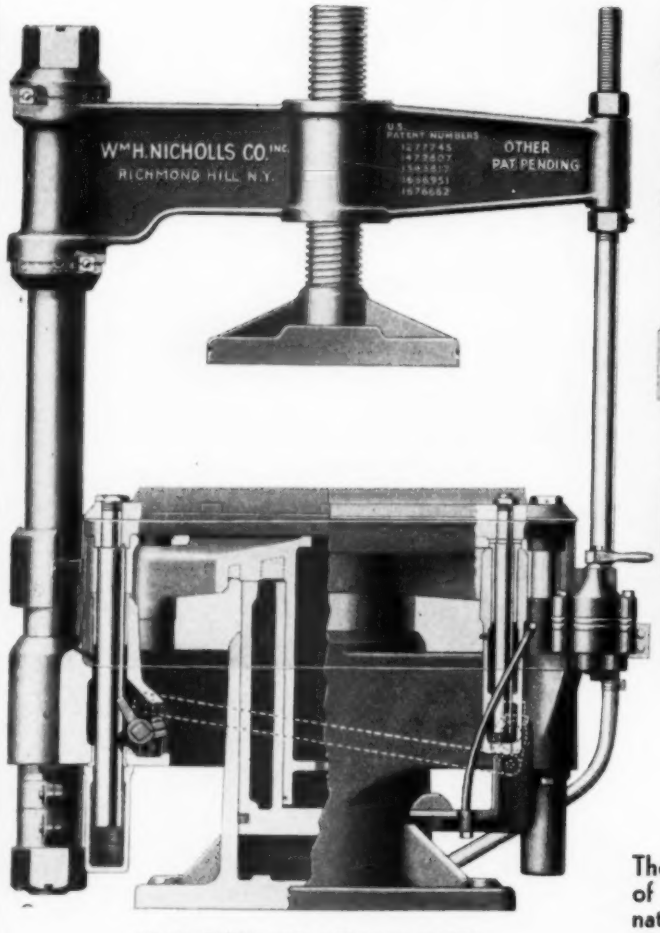
General Offices: Lafayette Building

MANUFACTURERS OF ALL TYPES AND SHAPES
OF CASTING AND DEOXIDIZING ALLOYS

MOLDING MACHINES

For Speed, Durability and Quality Castings

Jolt, Squeeze and Pattern Draw



12-36 TYPE "D" HEAVY DUTY
SECTIONAL VIEW

14-36 TYPE "D" HEAVY DUTY
IN RAISED POSITION

These machines have filled an important part in the success of many large foundries all over the world. This international acceptance is due to their ability to "stand up" under the heaviest production. The policy of "NICHOLLS" is to design molding machines with the minimum number of parts; machines of extreme ruggedness assuring lower maintenance and machines which can be operated by unskilled workmen.

If you will send us a sketch of your patterns, flask sizes and approximate number of molds required per day from each pattern, we will be pleased to make recommendations without any obligation on your part.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL, LONG ISLAND, NEW YORK

Established 1910

Foreign Manufacturers and Selling Agents—
For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

NICHOLLS

HOT METAL HANDLING AT TERRE HAUTE MALLEABLE & MFG. CORP.

The time required for bringing hot metal from the furnace to the mold is held to a minimum at the Terre Haute Malleable & Mfg. Corp. Terre Haute, Indiana, through use of an overhead Cleveland Tramrail System. This means less heat loss, greater production, lower costs.

The metal from the 60-ton furnace — one of the largest malleable iron furnaces in the country — is delivered directly to the molds without rehandling. The ladles ride on easy-rolling carriers on smooth overhead track that is above and away from where the dirt is most serious. The carriers are propelled onto transfer bridges that provide complete coverage of the pouring floor.

Cleveland Tramrail Equipment is built to withstand the rigors of heat and grime. Terre Haute officials cannot recall ever having trouble of any kind with their system although it is in continuous service. Practically no maintenance is required.

Hot malleable iron is taken directly from the furnace to the molds without rehandling in these 600-lb. ladles over the Cleveland Tramrail System.

The large castings, weighing up to 200 lbs. are poured from two ladles at a time. Each ladle is moved about the pouring floor by means of an individual transfer bridge.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

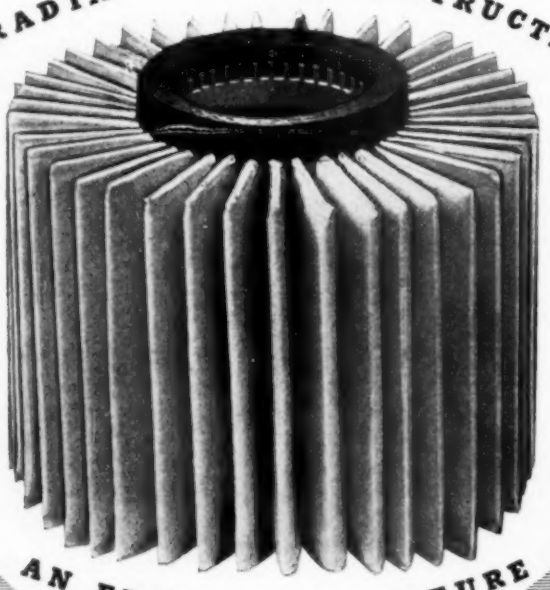
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

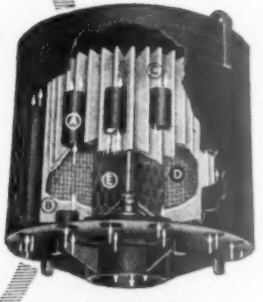
THE HEART OF EVERY PROTECTOMOTOR

RADIAL FIN CONSTRUCTION



AN EXCLUSIVE FEATURE

MODEL D
INTAKE FILTER



MODEL DS
INTAKE
SILENCER FILTER
(Sectional View)

MODEL CPH
AIR LINE
FILTER
(Sectional View)

MODEL CPHS
AIR LINE
FILTER
(Swing Bolt)

1. Provides DRY TYPE filtration.
   - (a) Positive—dry filter medium does not require periodic addition of any viscous coating or other filter aid.
   - (b) Can be selected oversize for severe conditions—does not depend on closely held air velocities for its ability to function.
   - (c) Essential for air intake of non-lubricated compressors.
   - (d) Performance unaffected by temperature changes.
   - (e) Ideal for dust storm areas—heavy dry dust particles do not adhere to filter medium.
2. Provides largest possible active filtering area in relation to space occupied (low resistance to air flow).
3. Provides rigid construction—(Radial Fin design eliminates presenting of broad flat surfaces to compressor and engine intake pulsations).

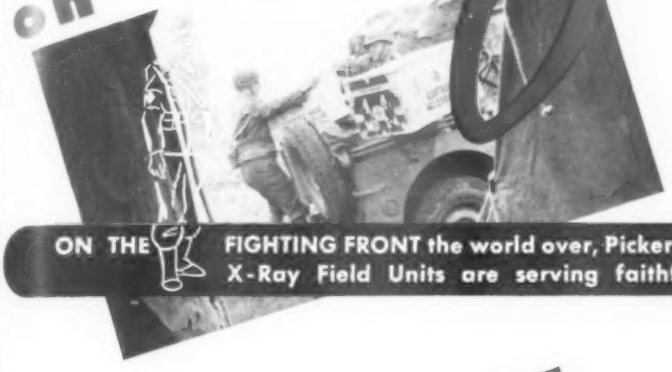
Representatives in Principal Cities

STAYNEW FILTER CORP. "Air Filter Headquarters"

36 Centre Park — PROTECTOMOTOR AIR FILTERS — Rochester, N. Y.

in the forefront

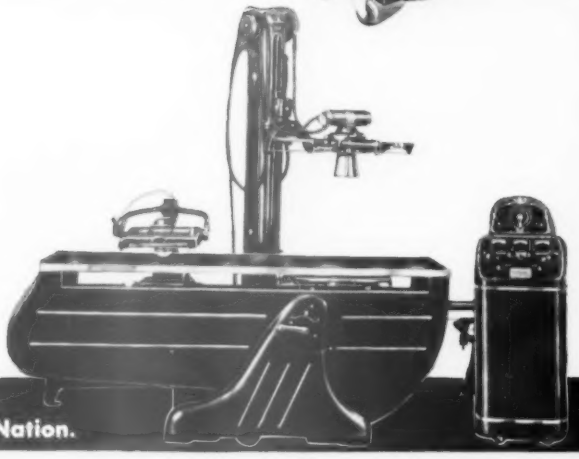
on



ON THE FIGHTING FRONT the world over, Picker U.S. Army Mobile X-Ray Field Units are serving faithfully, unfailingly.

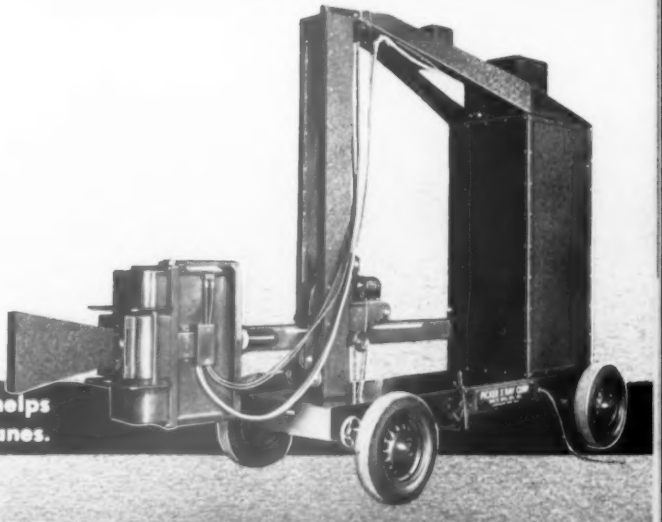
every

ON THE MEDICAL FRONT at home, Picker X-Ray Apparatus is playing a vital role in safeguarding the health of a Nation.



front

ON THE INDUSTRIAL FRONT Picker Industrial Equipment helps to maintain the mighty surge of ships, tanks, planes.



PICKER

PICKER X-RAY CORPORATION

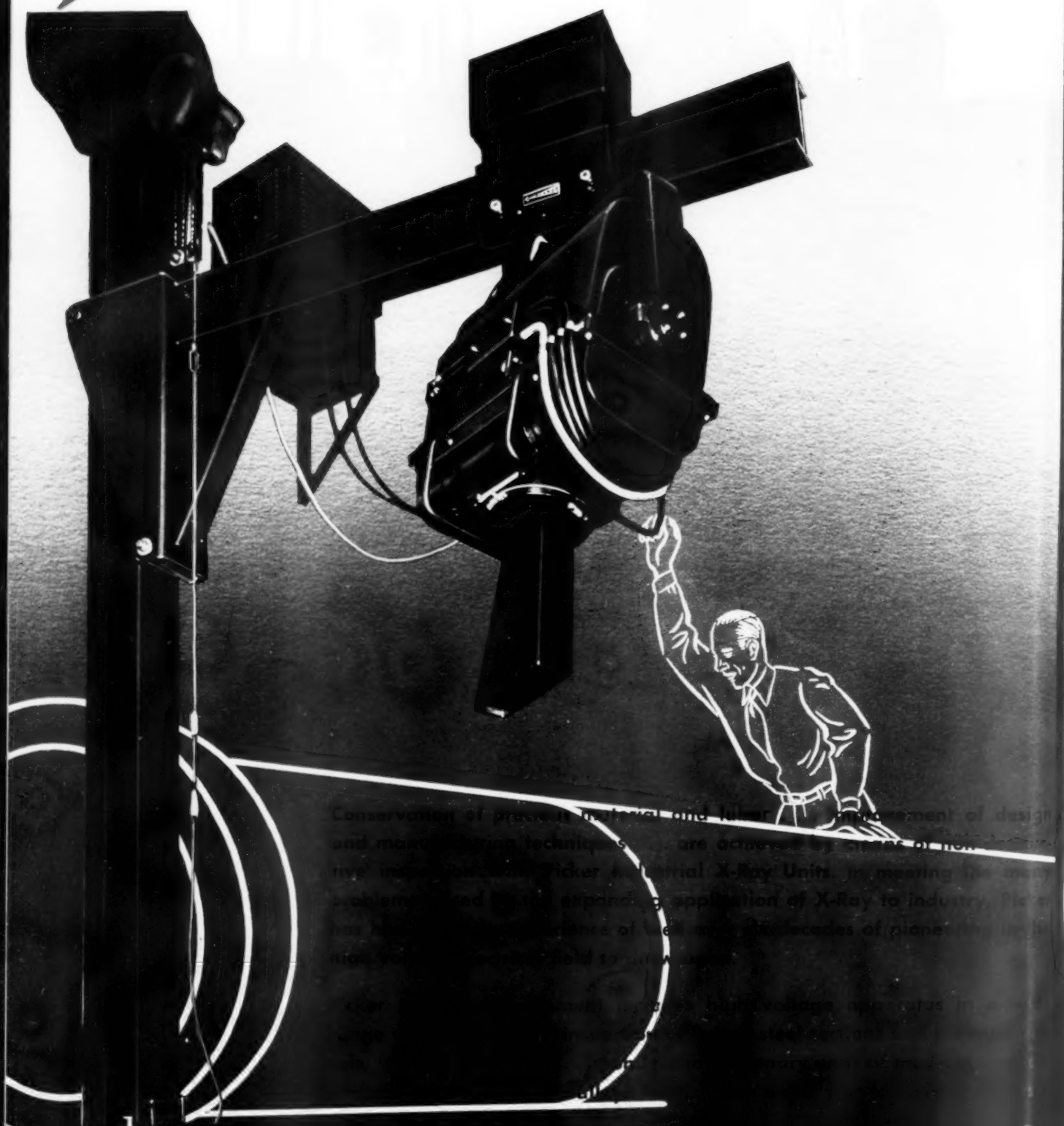
Waite Manufacturing Division — Cleveland, Ohio

300 FOURTH AVENUE — NEW YORK 10, NEW YORK

PICKER X-RAY OF CANADA, LIMITED

57 BLOOR ST., W. TORONTO — 758 SHERBROOKE ST., W., MONTREAL

Industry **finds Picker X-Ray** val



Conservation of proven [illegible] and [illegible] engineering [illegible] are achieved by [illegible] give [illegible] Picker [illegible] X-Ray Units. In meeting the many problems [illegible] expanding application of X-Ray to industry, Picker has [illegible] of the [illegible] principles of pioneering [illegible]

PICK

Picker X-Ray C

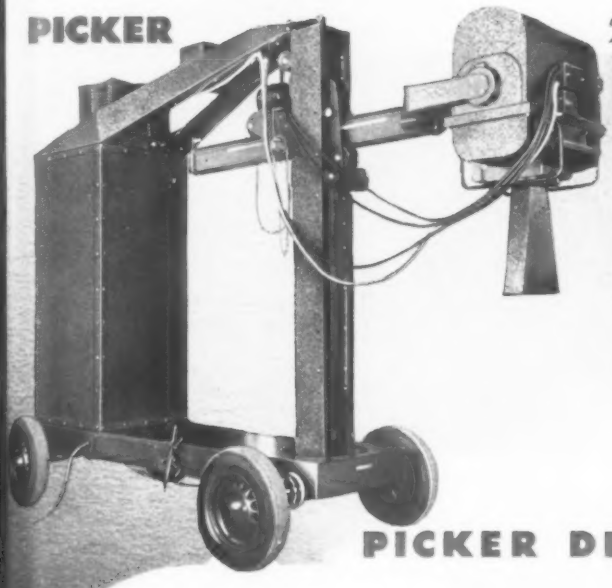
MANUFACTURERS OF HIGH VOLTAGE EC

valuable ally in war-time production

PICKER 150 KV INDUSTRIAL X-RAY UNITS

150 KV apparatus is a complete unit, ideal equipment for plants radiography is required at points widely within the plant itself. Where such unnecessary, a stationary version continuous radiographic inspection objects, as on a conveyor system.

PICKER 250 KV MOBILE APPARATUS



The self-contained, truck-mounted Industrial Unit finds very wide applica the metal industries. The mobile truck ing all necessary equipment, including tective control booth for the operato unparalleled flexibility in the radiogra heavy castings and massive welded st

PICKER DIFFRACTION EQUIPMENT

Analysis of crystal structure through X-Ray Diffraction Patterns is affording valuable means for the improvement of techniques and materials in many industries. The high standards of precision inherent in Picker Equipment have earned for this Diffraction Apparatus a commanding position in a very exacting field.

PX

Corporation

ELECTRICAL APPARATUS SINCE 1879

wartime role of Picker X-Ray in Medicine

saving ... the fighting front

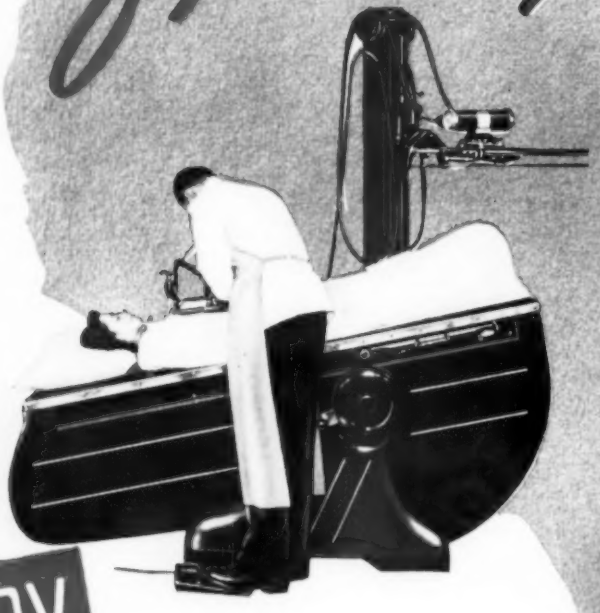
In 1939 ... Europe, Picker engineers working ... cooperation with the U. S. Army Medical ... the development of mobile X-ray Equipment ... be used close to front lines.

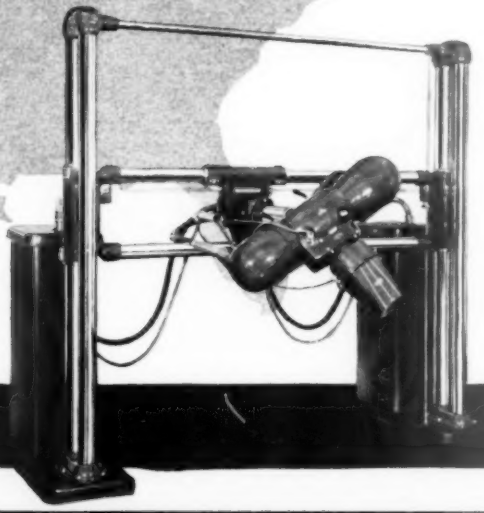
When Pearl Ha... this country into the conflict the Army Field ... ready when needed. To Picker X-Ray Corporation ... entrusted the vital task of supplying these rugged ..., which are now in operation on all of our far-flung fronts, bringing to hard-pressed front line surgeons X-Ray performance of the highest calibre and unfailing dependability. Under conditions which by peace-time standards would seem fantastic, these field X-ray units are operating consistently and dependably . . . in the desert's blistering heat . . . in the Arctic's congealing cold . . . their merit truly PROVEN UNDER FIRE!

U. S. Army Mobile X-Ray Field Unit

safeguarding ... health on the home front

Beset on all sides by shortages of equipment and personnel, *fewer* doctors must carry a *greater* war time load. Picker X-Ray apparatus is proving its mettle under these crushing burdens . . . and Picker Service Engineers are working night and day, the country over, maintaining essential apparatus at top efficiency.





PX

PICKER X-RAY

WHY SCHNEIBLE IS THE IDEAL WARTIME DUST CONTROL SYSTEM!

Long before the present armament production era, the Schneible Wet Method of Dust Collection had proved its superiority in numerous foundries; but it took the war to bring Schneible into its own. Today Schneible Multi-Wash Collectors continue to provide the following outstanding advantages:

1. *Manpower Savings*—A Schneible system requires practically no attendance. There is no bothersome accumulation of dust to dispose of—no filters or bags to clean. Nothing to become inoperative.
2. *Continuous Operation*—Schneible Collectors will operate and maintain clean air in the working zones 168 hours a week. No time out needed for adjustment, shaking screens or emptying bags or hoppers.
3. *No Replacements*—Maintenance is minimized because there are no moving parts to break, clog or rapidly wear. Nothing to burn, wear or freeze.

Schneible Multi-Wash Equipment is available in standard units to meet the dust and fume control needs of every foundry.

NOTE OUR NEW ADDRESS

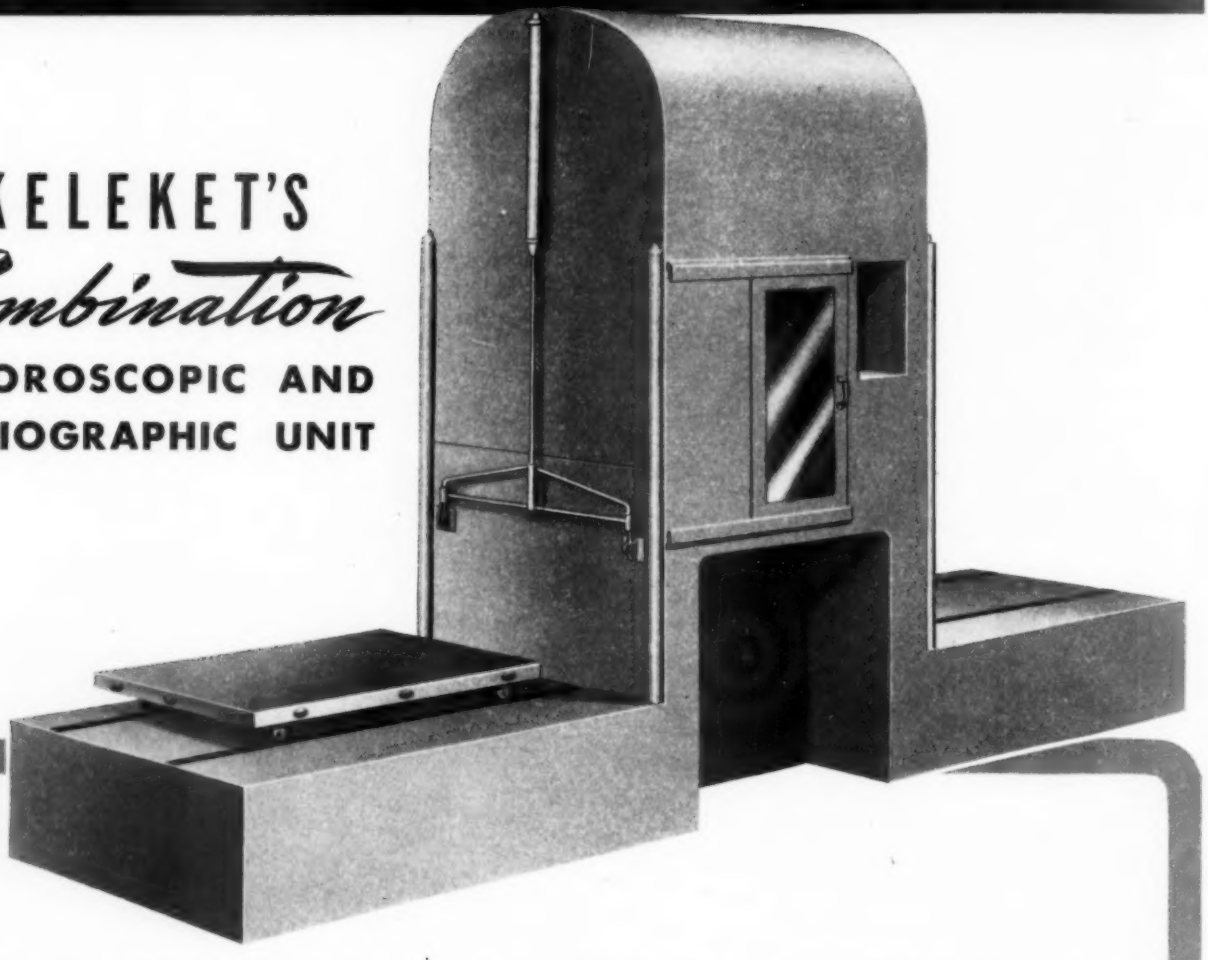
CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth Street
Detroit, Michigan

SCHNEIBLE

A NEW METHOD OF X-RAY INSPECTION THAT SAVES YOU MONEY

KELEKET'S *Combination*

FLUOROSCOPIC AND RADIOGRAPHIC UNIT



Do you realize that X-ray inspection by fluoroscopy—without the use of film—will save you both time and money? Films, chemicals and darkroom expenses are completely eliminated. This rapid, visual method provides a sensitivity that is definitely better than 5%—for many purposes, fully as satisfactory as radiography. In a large plant making a secret device for the Navy, KELEKET Fluoroscopic Equipment checked 48 units at one time. Rejects were cut from 75% to only 4%.

YOU CAN USE THIS SAME UNIT FOR RADIOGRAPHIC WORK

This KELEKET Combination Radiographic and Fluoroscopic Production Unit is designed so that you can take standard radiographs when you wish to have a permanent record, or when you are inspecting larger and heavier parts that do not lend themselves to fluoroscopic technique.

ARMY E NAVY

KELLEY-KOETT X-RAY MFG. COMPANY

2271 WEST FOURTH ST., COVINGTON, KY.

PIONEER CREATORS OF *Quality* X-RAY EQUIPMENT SINCE 1900

Foundry

METAL CUTTING MACHINE

Keeping ahead of trends in the processing of magnesium and aluminum castings, DeWalt introduces this specially designed machine for removing gates and risers. Completely new in foundry methods, this DeWalt puts the cleaning room *on a production schedule* and increases the efficiency of the entire foundry. Write for descriptive literature.

DE WALT PRODUCTS CORPORATION

LANCASTER, PENNSYLVANIA

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT MOLDING AND CORE SAND SILICA

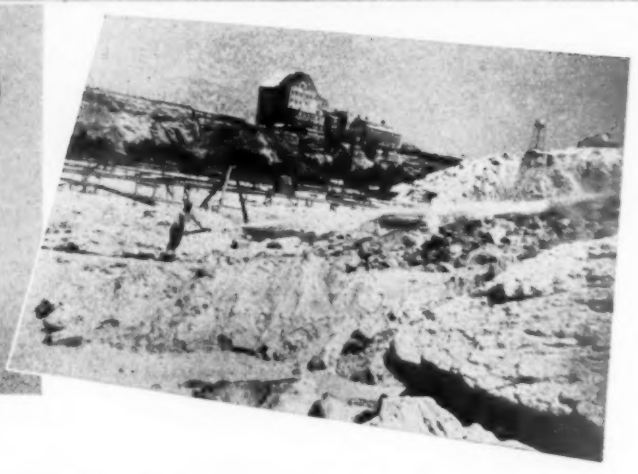
A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT IT PAYS TO USE SHOT

DIAMOND SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

CRYSTAL 99% PURE SILICA



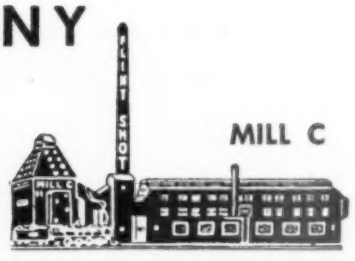
OTTAWA SILICA COMPANY

Ottawa, Illinois

MILL A

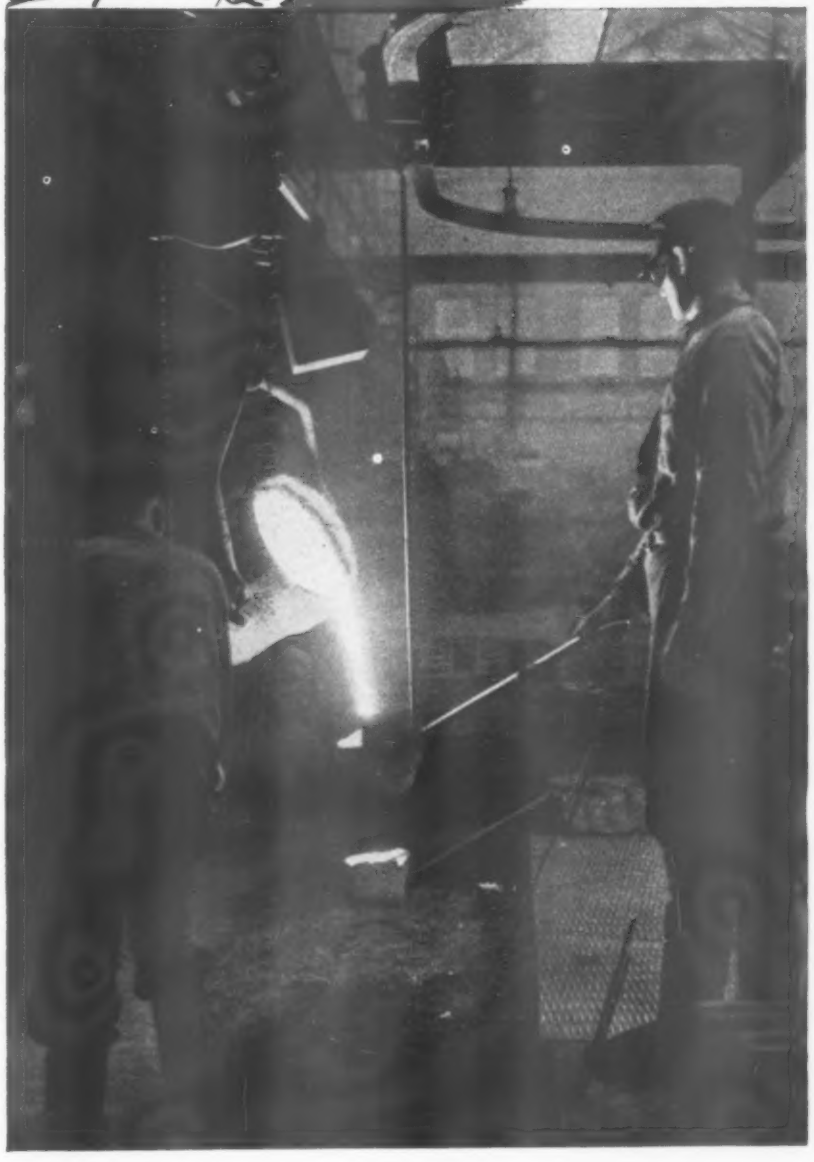
MILL B

MILL C



Always at Your Elbow

READY TO TACKLE *any* FOUNDRY PROBLEM



The Republic Pig Iron Metallurgist has only *ONE* job—and that job is to help foundry managers obtain the very best casting product and every pound of it possible from available equipment.

No matter how vexing or complicated the problem—whether it involves pattern or core making, flask preparation, cupola mix and operation, pouring, cleaning, grinding or what not—he is ready to tackle it. He is a qualified metallurgist who knows irons from the technical side—and a practical foundryman who knows how irons behave in actual foundry use.

He is ready to go to work for you—to help you improve quality, increase production or cut costs—and to be "always at your elbow" whenever you need him. Just tell us when to have him call.

REPUBLIC STEEL CORPORATION

General Offices: Cleveland 1, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York 17, New York

Republic

PIG IRON

"CHATEAUGAY"
Low-Phosphorus, Copper-Free
"REPUBLIC"
(Northern)
Foundry, Basic and Malleable
"PIONEER"
(Southern)
Foundry and Basic

ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

COLEMAN OVENS *Selected for*

One-Piece Stern Frame for 10,500 ton Liberty Ship

Photos by permission of United States Maritime Commission

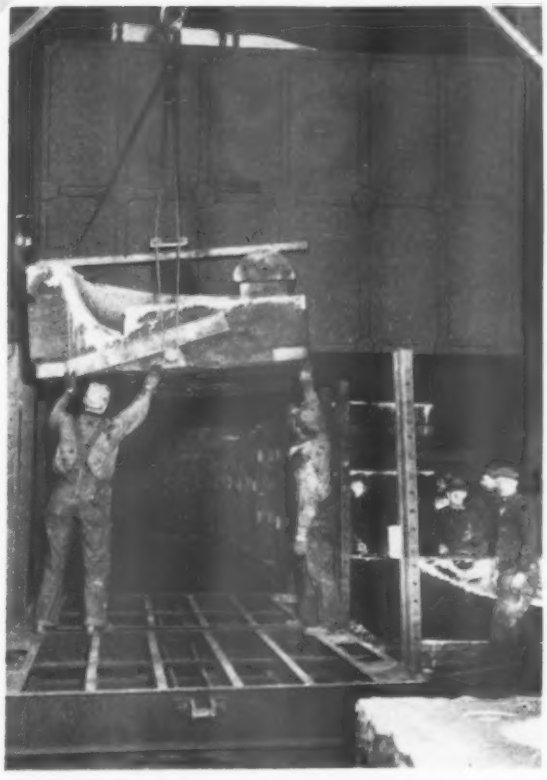
COLEMAN
CORE AND MOLD OVENS

THE FOUNDRY EQ
BUILDERS OF COLEMA ND
CLEVELAND OHI

Outstanding Core Job

MAKING one-piece stern frame for Liberty ships, entirely in cores, calls for the utmost in core-baking dependability. This battery of four Coleman Car-Type Core Ovens each hold over 400,000 pounds at one time with individual cores weighing up to 15,000 pounds.

The fine performance of our oven equipment on this outstanding core baking job is added proof of the ability of Coleman Oven Engineering to successfully meet any core-baking problem regardless of size.



Close-up view of one of four Coleman Car Type Ovens at Penn Steel Castings Co. Each oven contains 14 double-decking cars.

You can profit by our 40 years' experience gained in building over 8,000 successful Coleman Oven installations of all types and sizes.

A Coleman Oven Engineer will gladly call and recommend the oven installation which will do your job better, faster, cheaper. Or if you prefer, write for Folio of Bulletins first.

There is a right type and size of Coleman Oven for every job...

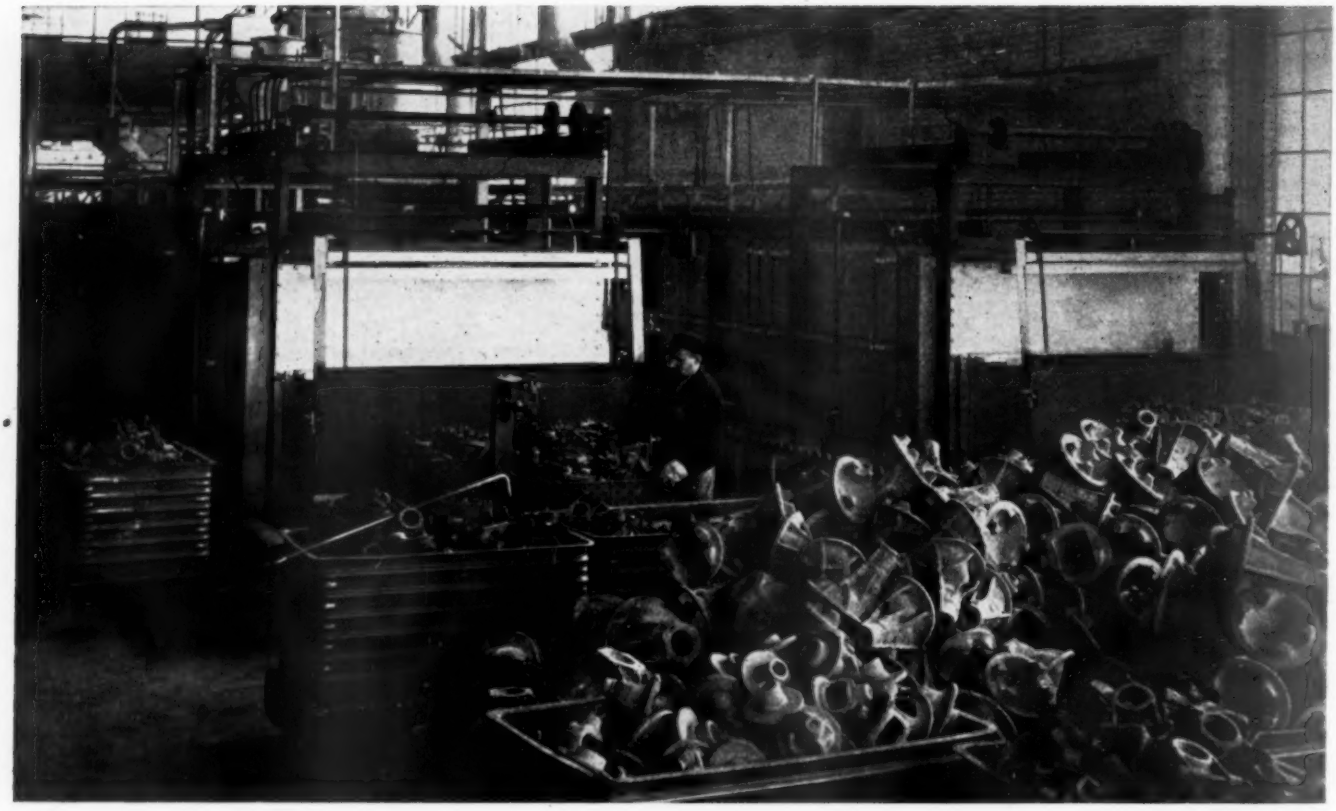
Coleman Ovens are built for whatever fuel is most easily and economically available in your district.

COLEMAN Portable Ovens
COLEMAN Rolling Drawer Ovens
COLEMAN Transrack Ovens
COLEMAN Car Type Ovens
COLEMAN Tower Ovens
COLEMAN Horz. Conv. Ovens

• Over 8,000 Installations

Y EQUIPMENT CO.
AND SWARTWOUT OVENS
LOHIO, U.S.A.

COLEMAN CORE AND MOLD OVENS



Quicker Deliveries on Malleable Castings

Cleaner and More Uniform Castings are Produced in 1/4th the Time in These EF Short Cycle Furnaces

In addition to cleaner and more uniform results and a tremendous saving in time; these short cycle malleablizing furnaces have greatly improved working conditions and reduced labor and operating costs. No packing material is used. A clean, protective atmosphere is used instead.

The castings are loaded into trays or directly on the hearth and without further attention, automatically pushed through the furnace and discharged at the other end absolutely scale free. Time and temperature are automatically controlled.

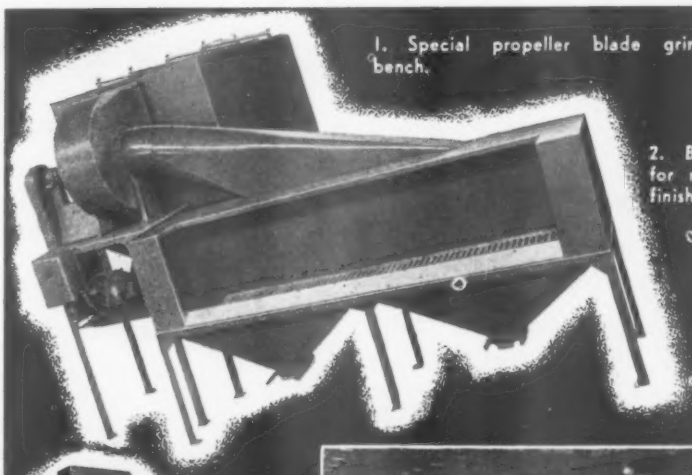
The above installation handles 40,000 pounds of castings per day. Larger or smaller continuous or batch type units can be furnished. These may be fired by means of gas-fired radiant tubes or may be electrically heated.

We have also made numerous other installations of various types including car and box types, pit types, recuperative and other continuous, semi-continuous, and batch types for malleablizing, annealing, and heat treating iron, steel, aluminum and magnesium castings. We also build furnaces for bright annealing, scale-free hardening, carburizing, copper brazing, nitriding, forging, billet heating and every other heating and heat treating process. Additional information gladly sent on request.

If you need more furnace capacity or if you have a production furnace problem, our engineers will be glad to discuss this with you.

The Electric Furnace Co., Salem, Ohio

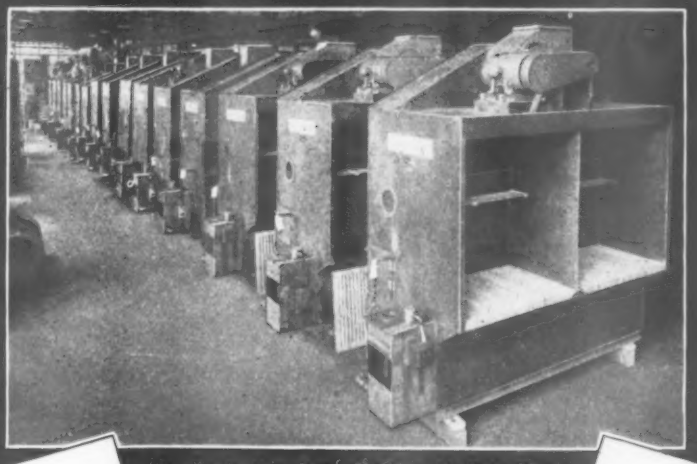
Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production



1. Special propeller blade grinding bench.

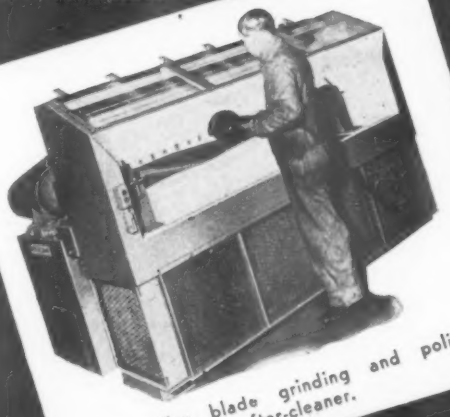
2. Booth type bench for magnesium casting finishing.

3. Finish grinding bench for small parts—equipped with filter after-cleaner.



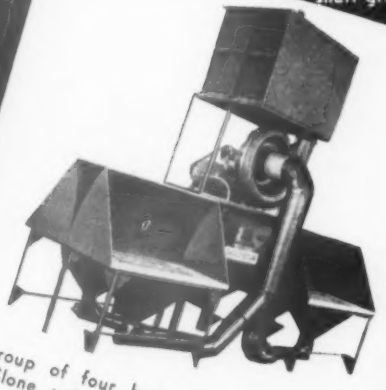
4. Production line of Type N Roto-Clone booth-type benches for grinding and burring magnesium castings.

5. Special Roto-Clone grinding bench with filter after-cleaner for flexible shaft grinding.



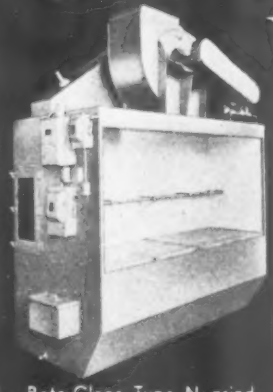
6. Propeller blade grinding and polishing bench with filter after-cleaner.

AAF
AMERICAN AIR FILTERS



7. Group of four benches served by single Roto-Clone unit with after-cleaner for small parts burring.

When requesting information on these special Roto-Clone benches, please identify them by number.



8. Roto-Clone Type N grinding bench for large magnesium castings.

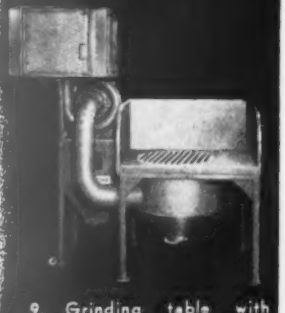
ROTO-CLONE

Dust Control

GRINDING BENCHES SPEED PRODUCTION

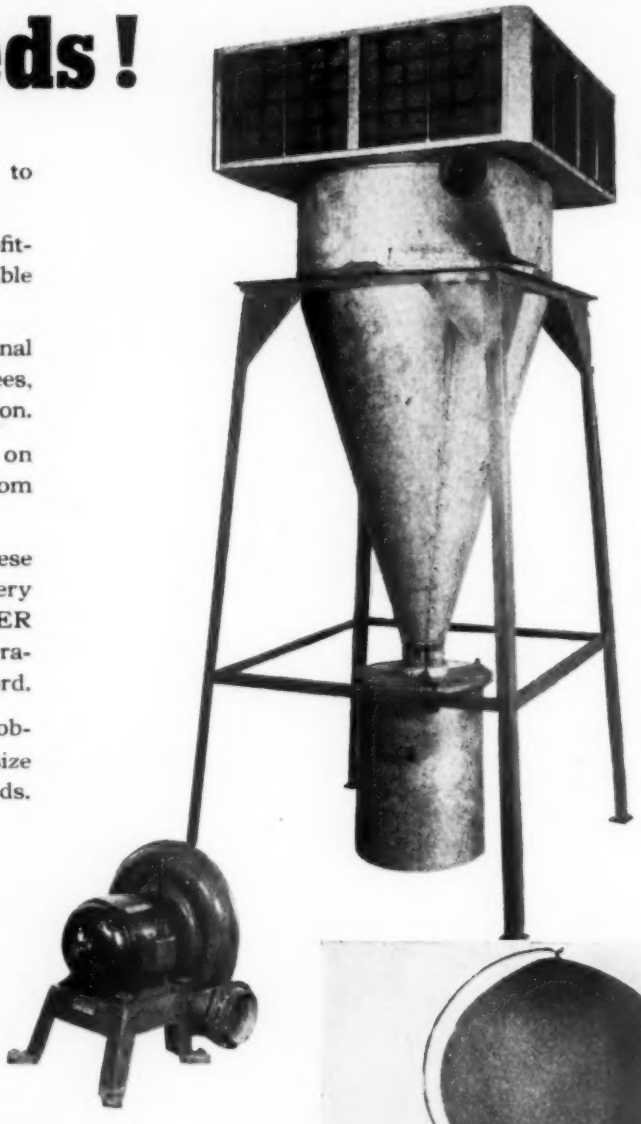
Shown on this page are some of the special AAF Roto-Clone grinding benches designed to meet specific needs in war production plants. Complete information on each will be sent on request.

AMERICAN AIR FILTER COMPANY, INC.
266 Central Avenue INCORPORATED **Louisville, Ky.**
In Canada: Darling Bros., Ltd., Montreal, P. Q.



9. Grinding table with rotating grill to facilitate working.

MASTER Dust Collectors for Many Needs!



● Unarrested dust from grinders is an enemy to profit in your plant!

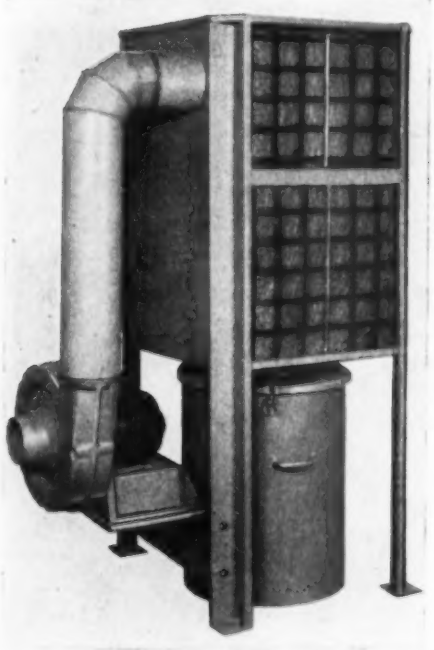
Unarrested dust from grinders robs you of profitable salvage materials, particularly from valuable and scarce metals, etc.

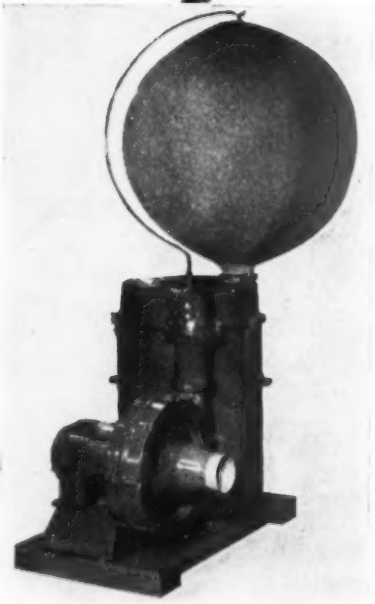
Unarrested dust from grinders is an occupational hazard, reducing the efficiency of your employees, hampering both quality and quantity of production.

Unarrested dust increases wear and tear on machinery, increases fire hazards and losses from soiled stock.

Use MASTER Dust Collectors to eliminate these potential dangers to your profits, existing at every grinding machine in your shop. There is a MASTER model to fit every type and size of grinding operation you may have . . . at a price you can afford.

Write us today, describing the dust-collecting problem you have, so that we can recommend the size and capacity of collector best suited to your needs.





Upper right: MASTER Cyclone Dust Arrester. Can be installed for inside or outside use (saves heat when installed inside). Various size containers available. Capacity 1000 CFM.

Left: MASTER Junior Cyclone Dust Arrester. Collects wood, metal, leather or plastics dust. Filters can be easily removed for cleaning or replacement. Capacity 600 CFM.

Right: MASTER Dust Collector. Very easily installed. Does not dissipate heat from room. An economical, efficient unit. Capacity 300 to 475 CFM.

THE KINDT-COLLINS COMPANY

"EVERYTHING FOR THE PATTERN SHOP"

12653 ELMWOOD AVENUE ★ CLEVELAND, OHIO

PARASPRAY *Process*

HELPING TO WIN THE WAR

PARASPRAY is our contribution to the War Effort. We are justly proud of the part it plays in helping to build more and better airplane engine castings.

QUALITY

. . . . PARASPRAY, in addition to stepping up production, is making higher quality castings possible by practical elimination of gas holes and porosity.

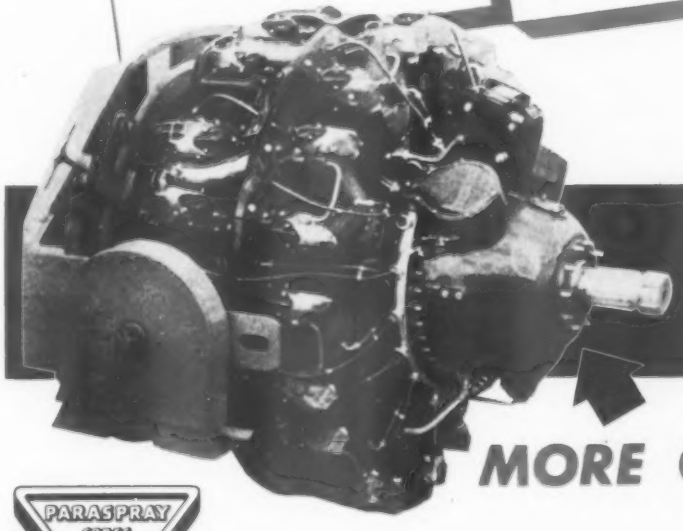
RESULTS

. . . . PARASPRAY, figures prove, has reduced scrap losses spectacularly and is thereby importantly stepping up cylinder head production with reduced man hours, space and equipment.

USERS

. . . PARASPRAY is regularly used by America's largest aluminum foundries casting complicated airplane engine cylinder heads.

PARASPRAY, is presently restricted to airplane cylinder head production. Like it PARASET, can advantageously be applied to casting procedures for all metals including steel. And PARACOAT has its place in every pattern shop.



MORE OF THESE BECAUSE OF THIS

PARASPRAY CORES MOLDS

PARASET CORE BINDER

PARACOAT FOR PATTERNS

FOUNDRY RUBBER COMPOUNDS CORP.

1050 - 30th St., N. W. Washington 7, D. C. REpublic 2256

Sole licensees under the Saeger Patents exclusively regulating the use of rubber compounds in making and spraying cores and molds.

SWINDELL

ELECTRIC ARC MELTING FURNACES

DOING A TOP-CAPACITY JOB
IN TODAY'S
VITAL WAR PRODUCTION

SWINDELL-DRESSLER *Corporation*
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES
PITTSBURGH, PA.

LO-HED HOIST

. . . speeds up and simplifies operation of 2-ton gantry

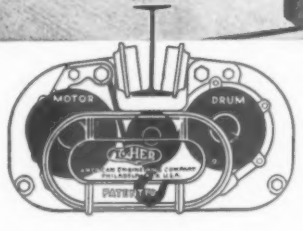
This two-legged gantry crane is entirely independent of the building for support.

A standard 2-ton Lo-Hed Hoist (plain trolley) glove-fitted into the design of the crane because a standard I-beam could be used for a rail, because "balanced construction" of the Lo-Hed permitted the hook to be drawn up to within an inch of the I-beam. That meant low headroom, a desirable plus feature, at no extra cost. Selection of a standard Lo-Hed Hoist facilitated quicker delivery.

In any hoisting job, including applications such as this, look into the possibilities of a Lo-Hed *first*. Write or telegraph for full information on Lo-Hed Hoists.

LO-HED IS THE "BALANCED" HOIST FOR HEAVY DUTY SERVICE

Other important features of the Lo-Hed Hoist are the heavy duty hoist motor; strong, short shafts; heavy duty bearings; 100% positive automatic stop; straight line spur gear drive; and removable protective covers for all vital parts.



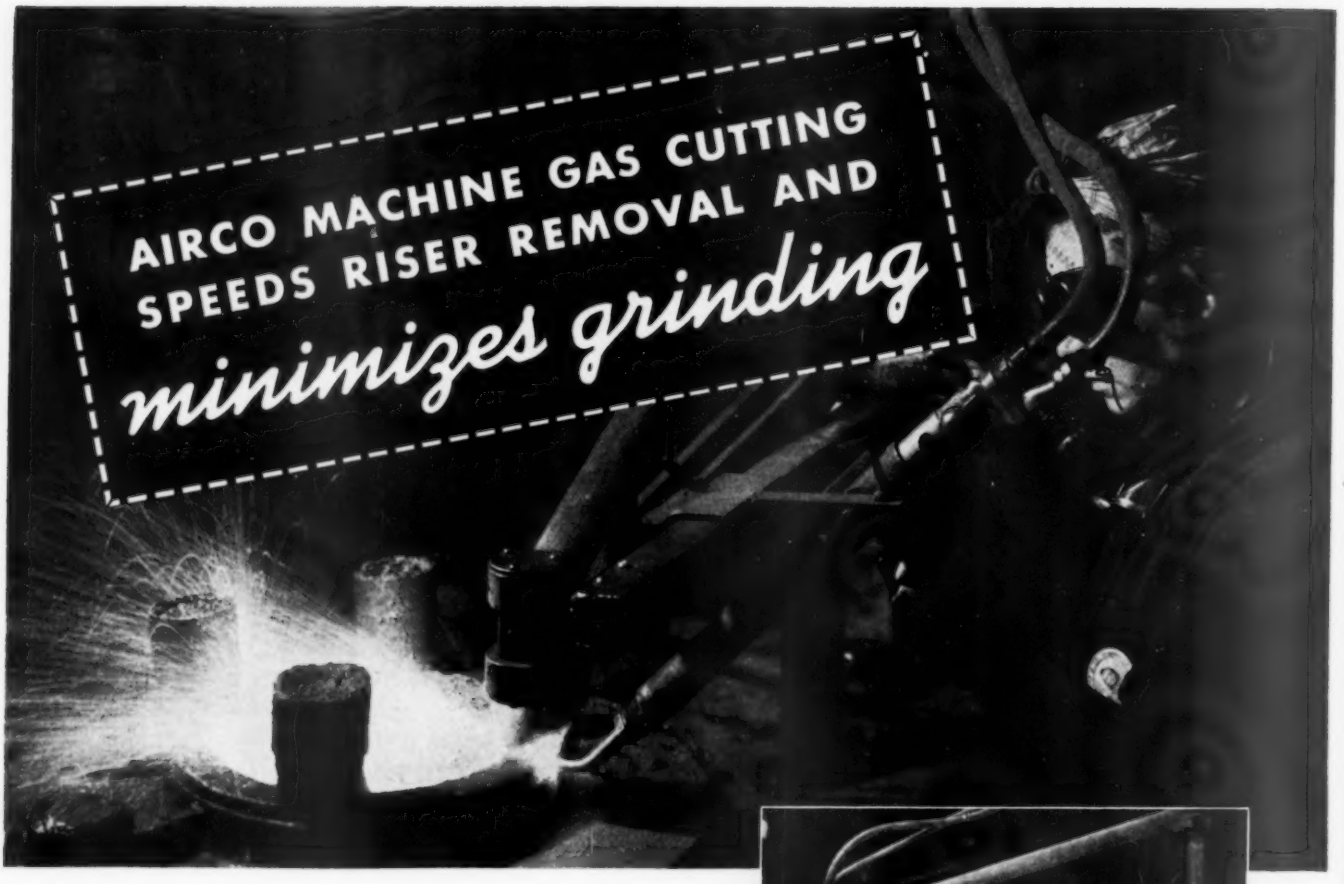
The Lo-Hed Hoist can be adapted for operation on any monorail system. There's a Balanced Lo-Hed Electric Hoist for Every Purpose.

Other A-E-CO Products:
TAYLOR STOKERS
MARINE DECK AUXILIARIES
HELE-SHAW FLUID POWER

AE CO 75th ANNIVERSARY

AMERICAN ENGINEERING COMPANY

2418 ARAMINGO AVENUE
PHILADELPHIA, PENNA.



Risers are cut off quickly and cleanly—with Airco machine gas cutting methods.

Here, for example, is illustrated a simple machine cutting set-up that permits accurate riser cutting on a fast production basis. This casting is clamped to a motor-driven turntable, and rotates at a regulated speed before a stationary Airco machine cutting torch. An adjustable torch arm holds the cutting torch in any fixed position desired. The woman operator completes between 50 and 60 castings per day.

Because of the accuracy, uniformity, and speed of this method, production is expedited and grinding time is minimized. Where machining of castings is specified, this method entirely eliminates grinding which may be required to prepare hand cut surfaces for machining.

As a further advantage, machine cutting set-ups do not require skilled manpower for efficient operation. Women quickly learn the simple mechanical procedures, and are not fatigued by the work.

Air Reduction service engineers will be glad to assist you in applying machine gas cutting methods. For further information, write to your nearest Air Reduction office.

Clean, accurate cuts like this are typical of the results provided by Airco machine riser cutting.

★ ★ ★

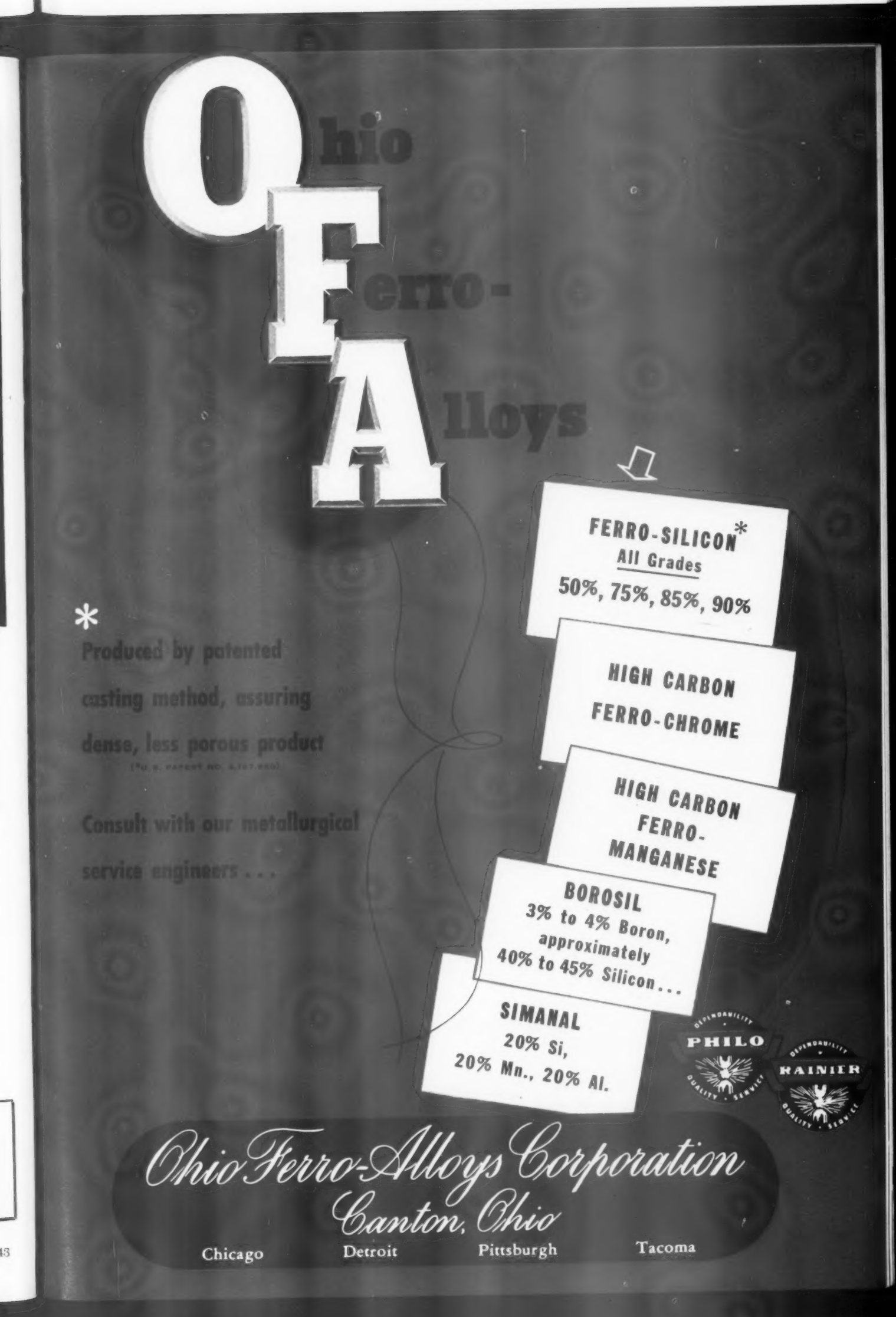
BUY UNITED STATES WAR BONDS

AIRCO WILSON

AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

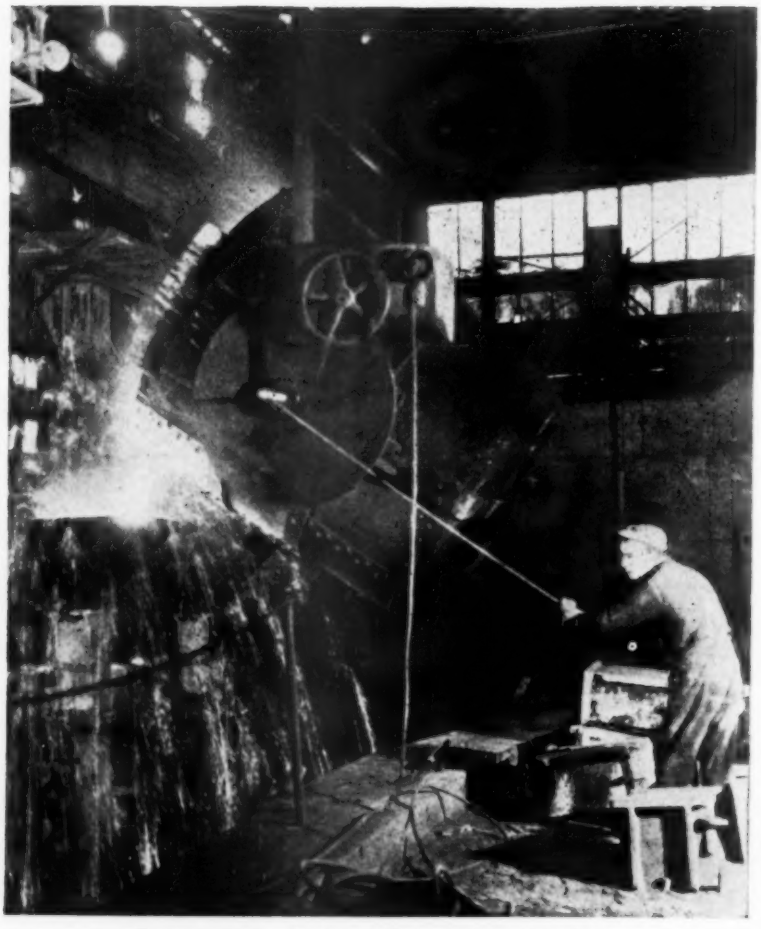
In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON, TEXAS


Ohio
Ferro-
Alloys
FERRO-SILICON*
All Grades
50%, 75%, 85%, 90%
HIGH CARBON
FERRO-CHROME
HIGH CARBON
FERRO-
MANGANESE
BOROSIL
3% to 4% Boron,
approximately
40% to 45% Silicon...
SIMANAL
20% Si,
20% Mn., 20% Al.
* Produced by patented casting method, assuring dense, less porous product
(U. S. PATENT NO. 2,707,810)
Consult with our metallurgical service engineers...
DEPENDABILITY
PHILO
QUALITY · SERVICE
DEPENDABILITY
RAINIER
QUALITY · SERVICE
Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago
Detroit
Pittsburgh
Tacoma

IRONTON BERLITE

REFRACTORY BONDING MORTAR FOR FOUNDRIES

Meets a long sought need



For greater brick life and better furnace efficiency, use "Ironton Berlite".

Address Box 309

"Ironton Berlite" refractory cement was developed purposely for foundry use. It has been giving unusually good service in brick lined ladles, the melting zone and well of cupolas, malleable furnace bungs and sidewalls and in electric furnaces where high alumina or super-duty brick are used.

Many foundries using "Ironton Berlite" have doubled the life of their cupola blocks and have obtained five times as much service from brick lined ladles as they did when fire clay was used.

"Ironton Berlite" is easy to use and it gives a tight, strong joint. It does not shrink like fire clay and its high refractoriness prevents joint erosion. This is the super-quality refractory cement, progressive foundrymen have been seeking for many years. It will increase your furnace efficiency and reduce your costs.

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

To the FOUNDRYMEN of tomorrow

"VULCAN" is the well known McCormick Blacking.

For fifty years it has performed one important function—preventing molten metal from "burning in".

We adjust Vulcan Blacking to sand mixtures, and to methods of application. It really peels a casting and shortens cleaning time.

If you are not using Vulcan Blacking on your cores and dry sand work, we would like to have you try it.

Made and sold by

J. S. McCORMICK COMPANY
25TH STREET AND A. V. R. R.
PITTSBURGH 14, PA.

BONDED VULCAN BLACKING — VULCAN GREEN SPRAY — VULCAN AUTOMOTIVE BLACKING

There is a
BAY STATE WHEEL
for <u>every</u> CUT-OFF JOB

1. Constant, rigid laboratory check on all raw materials.
2. Manufactured in air-conditioned department to control characteristics of bonding agents.
3. Rough sides — a development for cleaner, cooler, faster cutting.
4. Special heat resistant compositions to prevent excessive bond disintegration.

These are but a few reasons why BAY STATE wheels excel. Write for bulletin containing specific recommendations.

BAY STATE
ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

It might be Greek to you —

Yes, the Spectrogram above might very well be Greek to you. But it is a highly indispensable and invaluable part of the system of controls used by Michigan Smelting technicians in developing non-ferrous alloys to precision specifications. The spectro lines identify the various elements contained in the alloy. By rapid mathematical evaluation of the spectro lines, our metallurgists are able to accurately determine the composition of each heat while it is still in the furnace. The speed of this method enables them to control the composition of the molten metal to meet exacting specifications before the casting of the ingots.

Michigan Smelting
and Refining

DIVISION OF

BOHN ALUMINUM & BRASS CORPORATION

DETROIT, MICHIGAN

General Offices: Lafayette Building

FOR VICTORY
BUY UNITED STATES
WAR SAVINGS
BONDS & STAMPS

50 YEARS OF KNOW-HOW

CLEAN CASTINGS
INCREASE PRODUCTION

TAM FOUNDRY ZIRCONITE SAND YIELDS SMOOTH CASTINGS AND REDUCES CLEANING TIME

TAM Foundry Zirconite Sand used for the entire mold or as a facing sand resists the burning in of the metal and makes possible the production of clean castings and the expansion of output by reducing time in the cleaning department.

TAM Foundry Zirconite Sand does not warp, requires minimum venting and the faster chilling permits better metal distribution into heavy sections and reduces "hot tears"! Four important factors.

TAM Foundry Zirconite Sand is available in three grades, Zirconite Sand A has an approximate melting point of 3812° F. Zirconite Sands B and C 3650° F.

Full particulars on the proper applications of Foundry Zirconite Sands will be sent immediately upon request. Write:

TITANIUM
ALLOY MANUFACTURING COMPANY

TAM Foundry Zirconite Sand "A" was used in the core for the chrome steel impeller wheel illustrated. Note the clean, smooth surfaces.

TAM ZIRCONIUM AND TITANIUM PRODUCTS
Registered U. S. Pat. Off.

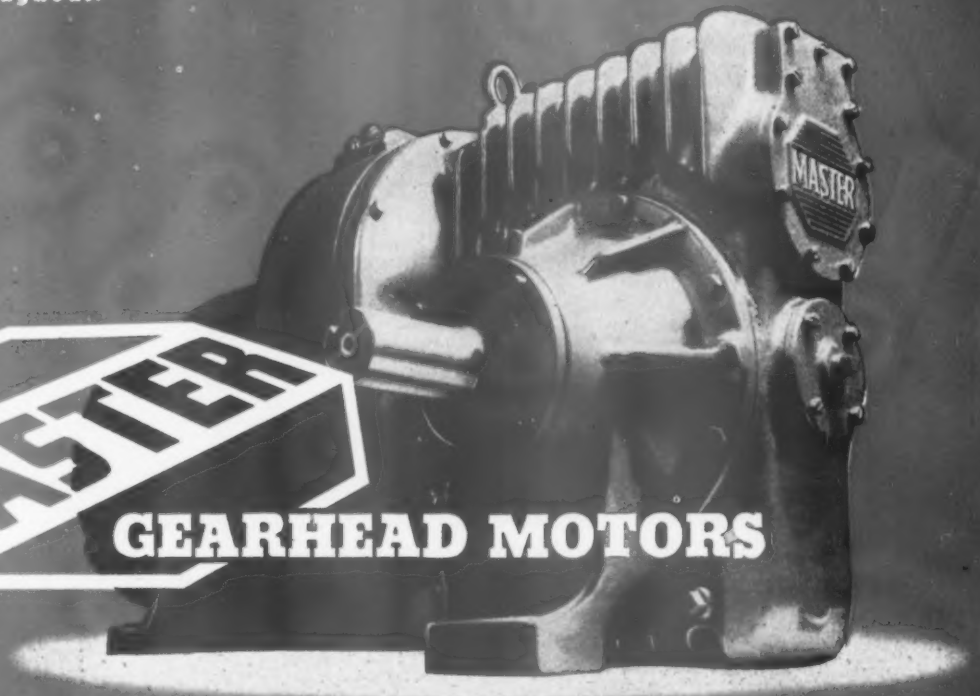
GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

Representatives for the Pacific Coast . . . BALFOUR, GUTHRIE & CO., San Francisco, Los Angeles, Portland, Seattle, Tacoma
Representatives for Canada . RAILWAY & POWER ENG. CORP., Ltd., Toronto, Montreal, Hamilton, Winnipeg, Vancouver, Sydney
Representatives for Europe . . . . . T. ROWLANDS & CO., Ltd., 23-27 Broomhall St., Sheffield, England

1/10 TO 100 HORSEPOWER

Five types of gearhead motors have reduction ratios ranging up to 432 to 1.

You can secure Master Gearhead Motors for mounting in any position because anti-friction bearings and all-metal lubricant seals are used throughout.



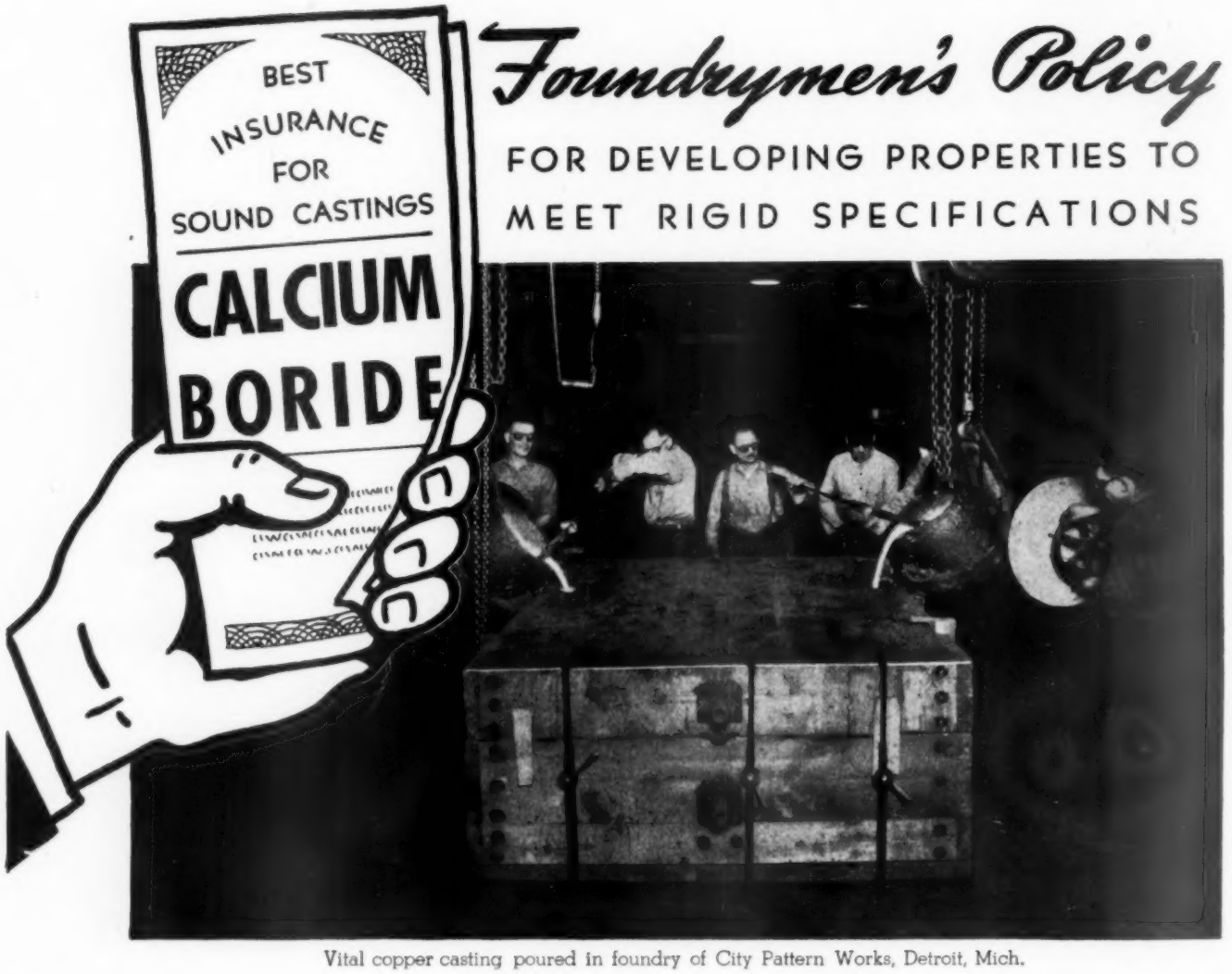
MASTER GEARHEAD MOTORS

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

Available in a wide range of types including explosion proof, splash proof, fan cooled, multi-speed, uni-brake motors and Speedrangers.

Save material and save space with simple, compact, integrally built Master gearhead motors.

BUY UNITED STATES WAR BONDS AND STAMPS



Foundrymen's Policy

FOR DEVELOPING PROPERTIES TO MEET RIGID SPECIFICATIONS

Vital copper casting poured in foundry of City Pattern Works, Detroit, Mich.

Wherever Calcium Boride is used, foundrymen are not worried about developing properties to meet the most rigid specifications for:

GREATER DENSITY • HIGHER ELECTRICAL CONDUCTIVITY • FREEDOM FROM GASES AND OXIDES

It is the most active and thorough agent for copper, bronze, ferrous and nonferrous alloys.

Reactive at normal operating temperatures, it does not require excessive super heat.

Because this powerful agent is insoluble it leaves no residual metal impurities, but disappears after reaction in the form of slag.

In no way is the fluidity of the metal affected.

Today more than ever Calcium Boride is widely used, because in addition to its efficient performance it contains no critical or strategic elements and is not, therefore, under W.P.B. allocation.

Electro's Calcium Boride is an electric furnace product.

ELECTRO REFRACTORIES AND ALLOYS CORP.

EXECUTIVE OFFICES: 201 VARS BUILDING, BUFFALO 2, N. Y.

Manufacturers of Crucibles Alloys, Stoppers, Refractories, Grinding Wheels

DoALL BAND FILER

9 Times Faster THAN HAND FILING

For internal *file broaching* the band is opened, inserted through the work and snapped together in only a few seconds.

DoALL Band Filer with motor and all moving parts fully enclosed occupies less than 2½ x 3 feet of space.

An hour's filing job done in six or seven minutes because, with DoALL, filing is merely a matter of *feeding the work!* Metal is removed in clean cut, curved chips constantly while the work is fed against the endless band of precision fit, interlocked, file segments.

New accuracy too! Positive controls of work and file speed permit filing to "die-fit" tolerances—smooth machined finishes—by relatively inexperienced operators.

Investigate the vastly greater efficiency of DoALL Band Filing—in production, tooling or maintenance work—on all metals from tool steel to soft brass and wood, fibre and plastics, too! Telephone your nearest DoALL Sales Office—now!

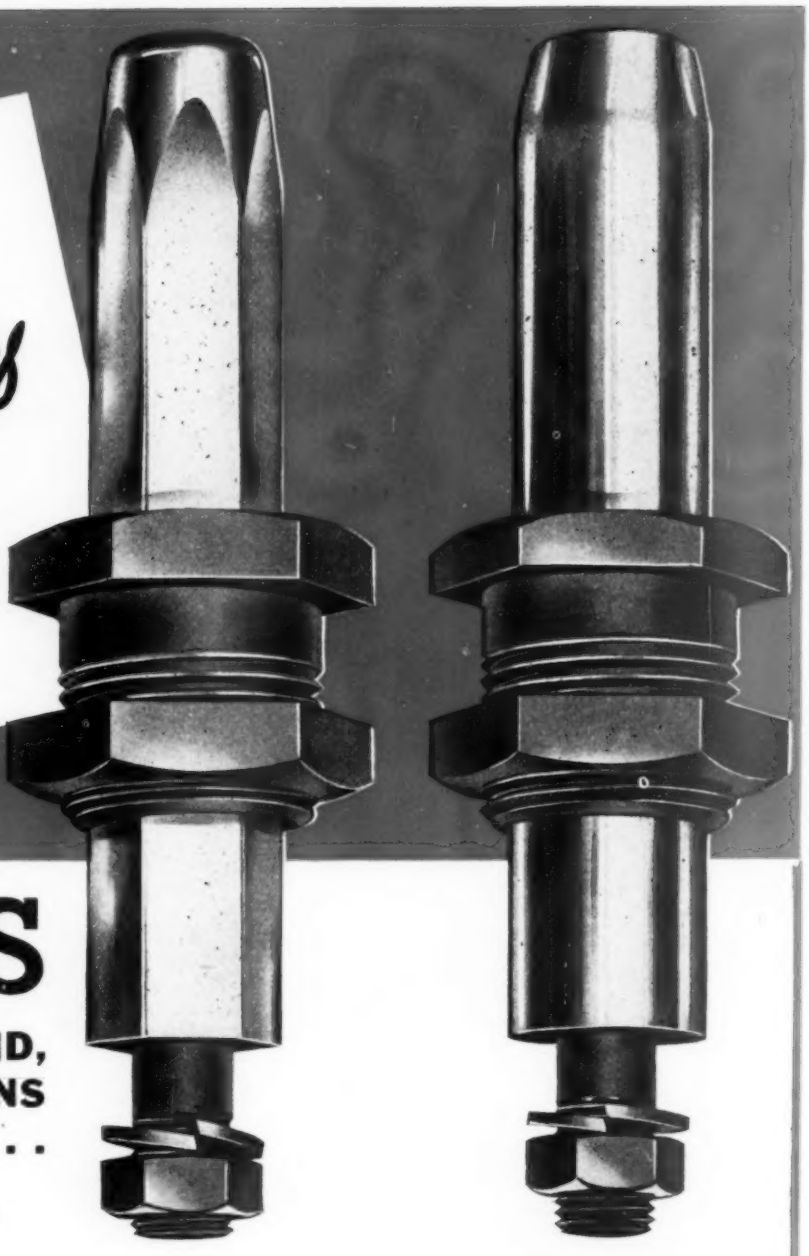
FREE: Bring or send your filing problem for a complete time-and-method study—*the* DoALL *way.*

DoALL **SALES OFFICES IN 34 PRINCIPAL CITIES**

BAND FILER IS MANUFACTURED BY CONTINENTAL MACHINES, INC.

ADDRESS INQUIRIES TO 1301 WASHINGTON AVE., SOUTH, MINNEAPOLIS, MINN.

IDEAL FOR ALL *Pattern Plates and Flasks*



HINES

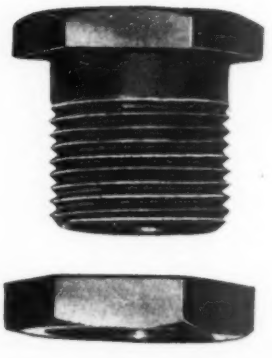
HARDENED, GROUND, CHROME PLATED PINS AND BUSHINGS . . . .

Require no Lubricants

WILL NOT RUST
WILL NOT STICK
(Tolerance .002")

All standard sizes carried in stock.

Bushings are made in two lengths for thick and thin pattern plates.



ROUND AND OBLONG BUSHINGS—
Oblong bushing used with round pin or our hex pin.

MAKERS OF FOUNDRY FLASKS AND JACKETS Since 1919

HINES FLASK COMPANY
Phone ACademy 1480
1324 HIRD AVENUE • CLEVELAND, OHIO

ACCURATE HYDRAULIC ELECTRODE POSITIONING

and POWER OPERATED ELECTRODE CLAMPS

are two of the many features of Hydro-Arc Furnaces

• Of the many advanced Hydro-Arc features, these two are particularly outstanding and offer advantages not available elsewhere. Low inertia counterbalancing and small reversing pump motors (which do not surge above their full current rating) result in (1) highest electrode speeds on automatic control, (2) most accurate positioning. The electrodes start and stop instantly in cooperation with the new automatic controls. There is less surging . . . improved power factor . . . less transformer heating . . . less carbon pickup . . . less electrode usage. The entire furnace is surprisingly simple in design. It is the product of experienced engineering . . . careful manufacturing . . . rigid inspection . . . and conscientious service.

Write for more information about what has been called "The most important development in electric furnaces in the past twenty years."

HYDRO-ARC
FURNACE CORPORATION

561 HILLGROVE AVENUE, LA GRANGE, ILLINOIS (A Suburb of Chicago, Illinois, U. S. A.)
TELEPHONES: LA GRANGE 4545 and 4546 CHICAGO LINE: ENTERPRISE 1068

Associated with Whiting Corporation

for THIS battle, G.H.Q. is at YOUR own desk!

★ Here's how you—yes, YOU—can carry out a smashing "pincer movement" against the Axis. Swing in on one flank with increased production of war goods! Drive in on the other with redoubled purchases of War Bonds through your Pay-Roll Savings Plan!

You're an officer in both of these drives. Your personal leadership is equally vital to both. But have you followed the progress of your Pay-Roll Savings Plan as closely as you have your production?

Do you know about the new Treasury Department quotas for the current Pay-Roll Allotment Drive? *Quotas running about 50% above the former figures?* You see, these new quotas are based on the fact that the armed forces need more money than ever to win the war, while the average worker has more money than ever before to spend. Particularly so, on a *family income* basis—since in so many families several members are working, now.

Remember, the bond charts of today are the sales curves of tomorrow! Not only will these War Bonds implement our victory—they'll guard against inflation, and they'll furnish billions of dollars of purchasing power to help American business re-establish itself in the markets of peace.

So get this new family income plan working at once. Your local War Finance Committee will give you all the details of the new plan. Act today!

This advertisement prepared under the auspices of the War Advertising Council and the U. S. Treasury Department

LET'S KEEP ON Backing the Attack!

This Space is a Contribution to America's All-Out War Effort by

THE FOUNDRY

FROM BOILER to "Belly Bubble"

SECONDARY ALUMINUM TAKES TO THE AIR!

One device that plays a mighty important part in getting our Fortresses there and back—safely, is the inconspicuous but deadly little "belly bubble" or power-controlled lower gun turret on the underside of our bombing planes.

Precision-built, it is essential that its constituent metals be above reproach in quality. That is why we're proud that Federated aluminum is contributing to the fabrication of these little Axis eradicators—and also for parts of guns, tanks, planes and many other vital units of our war machine.

Today, thanks to meticulous control plus advances in metallurgical processes, secondary aluminum ingot is comparable in quality to the best of aluminum. Federated aluminum will meet your requirements.

Consulting service available through your nearest Federated office.

PRODUCTS PRODUCED BY FEDERATED METALS

ALUMINUM
BRASS
BRONZE
DIE CAST ALLOYS
SOLDER
BABBITT
TYPE METAL
ZINC DUST

All of these in all commercial forms—Special Alloys to your specifications.

FMD

Federated

METALS DIVISION

AMERICAN SMELTING and REFINING COMPANY

120 BROADWAY, NEW YORK (5) N. Y.

Nation-wide service with offices in principal cities

CLECO

ROTARY GRINDERS *SPEED* PRODUCTION IN THE CLEANING ROOM

These four important features explain why so many foundrymen prefer Cleco Rotary Grinders:

1. PRECISION CONSTRUCTION — All Cleco Grinders have alloy steel rotors and carburized cylinders, heat-treated and then ground to exact size, thus insuring smooth, vibrationless operation at all speeds. The highest grade ball bearings are used throughout.

2. RUGGED DESIGN — The one-piece casing, extending around the spindle and including the cylinder, plus the use of through bolts to hold the handle, provides the utmost in durability. Improved governor design prevents metal-to-metal contact, thus eliminating wear or binding. Cleco Grinders are completely rust-proof.

3. EASY MAINTENANCE — Only four bolts need removal to get at the rotor for cleaning or replacing blades. The automatic oiler and the Zerk fitting on the top bearing promote efficient lubrication at all times.

4. SMOOTH OPERATION — You can't beat Cleco Grinders for power, smooth action, lack of vibration, and light, easy handling. To meet every requirement, Cleco Rotary Grinders are available in a dozen sizes and types for foundries.

Write for Bulletin 80 that fully describes Cleco Grinders and includes a large blueprint of construction details.

Other Cleco tools for the foundry include sand rammers, grinders and accessories.

The heavy-duty Cleco 830S Grinder with straight handle. Also available with spade handle.

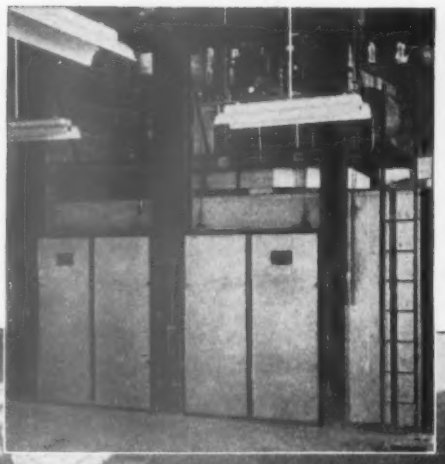
THE CLEVELAND PNEUMATIC TOOL CO.

3781 EAST 77th STREET CLEVELAND, OHIO

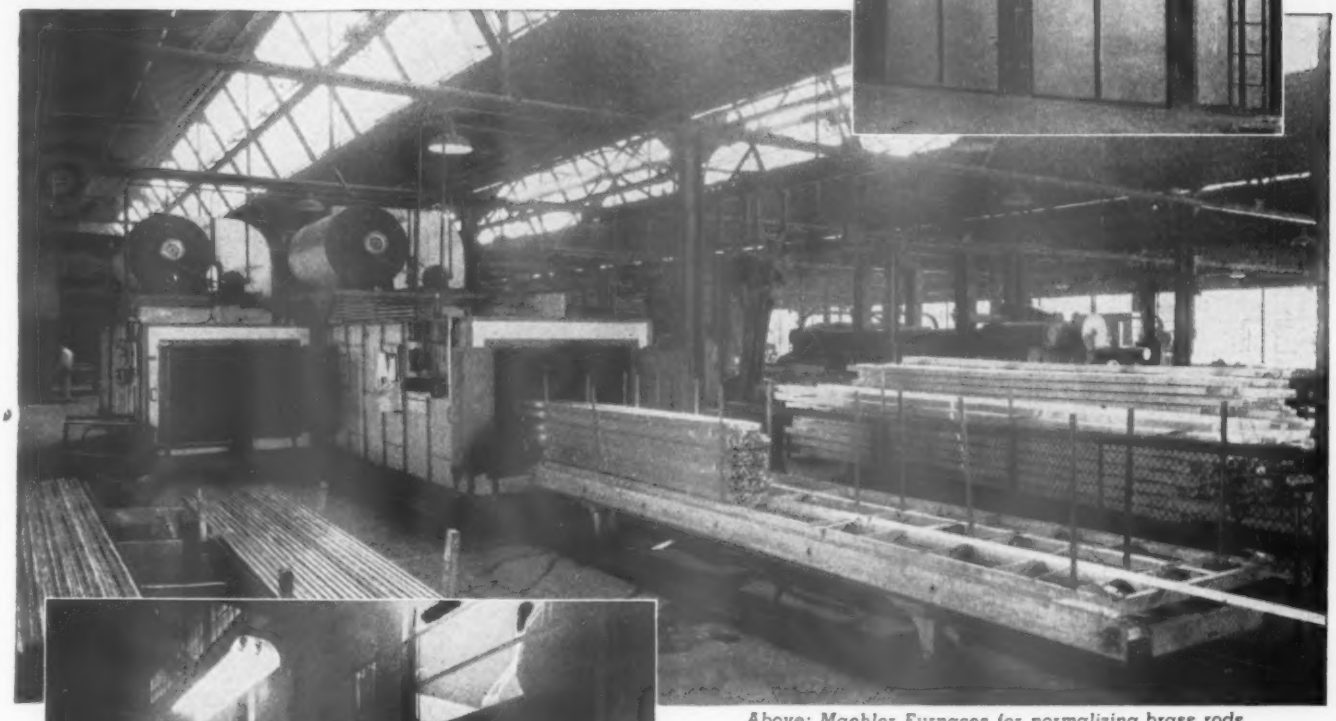
BRANCH OFFICES IN ALL PRINCIPAL CITIES

Specialists

on Magnesium & Aluminum HEAT TREATMENT



Right: Typical Maehler 2 compartment magnesium aging furnace.



Above: Maehler Furnaces for normalizing brass rods and extruded aluminum shapes, Bohn Aluminum & Brass Corp.

Above: 8 of the many Maehler core ovens at Howard magnesium, aluminum and bronze foundries.

MAEHLER furnaces and ovens ranging from 200 to 25,000 lb. charge are solving the heat treating problems of magnesium and aluminum for top-flight war plants all over the country. This includes furnaces for: billet normalizing; aging and annealing of extruded shapes up to 40 ft. long; annealing of aluminum tubes up to 40 ft. long; smaller furnaces for airplane doors, small castings, etc., and aging ovens for magnesium castings and for tempering brass bars.

Exceptional heat uniformity (within 5°) is produced by high volume and rapid airheat circulation, and highest grade instruments. Billets, tubing or other parts are not burned by an excess of temperature.

Maehler core and mold ovens are available in a complete range of oil fired, gas fired, and electrically heated units, incorporating the Maehler recirculation principle for high uniformity and output, at low cost.

Let us quote you on your requirements.

A Few Typical Users of Maehler Equipment

Advance Aluminum Castings Corp.	Bohn Aluminum & Brass Corp.
Phelps Dodge Corporation	Magnesium Fabricators
Packard Motor Car Co.	General Motors Corp.
Revere Copper & Brass	Sargent & Greenleaf
Ebaloy Foundries	Howard Foundries

Extruded Metals Corporation

MAEHLER

Industrial Ovens and Furnaces for Core Baking, Mold Drying, Heat Treating, Enameling, etc.

The PAUL MAEHLER CO., 2200 W. Lake St., Chicago, Ill.

Osborn helps swords of light pin the enemy in the air

FIGHTING men on every battlefront, and civilians in certain areas here at home, are familiar with the long blades of brilliant light that periodically probe and sweep the night skies above their heads. But here are some things about the powerful searchlights behind those bright protecting shafts that may not be so well known:

—Their converging beams can pin an aircraft miles in the sky with a light so bright the pilot could read a newspaper by it, if he had one;

—Light produced by the arc inside is about the same intensity as the sun on its surface;

—They are 5 feet across and are rated at 800,000,000 beam-candlepower;

—They are fully mobile, carrying their own generating equipment with them;

—They are in use by the United Nations all over the world;

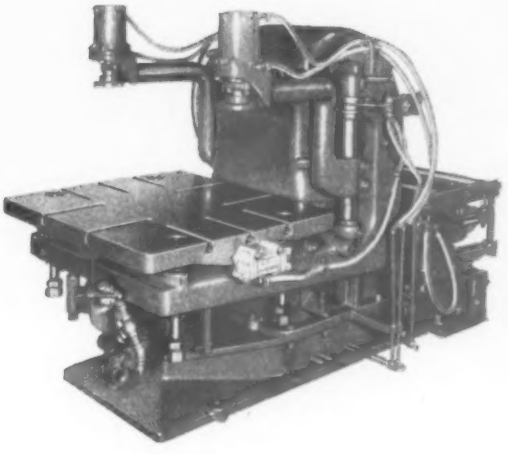
—They are a product of the Sperry Gyroscope Company, famous for precision products;

—Many of their rugged but precision-engineered castings are moulded on Osborn Moulding Machines.

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue *Cleveland, Ohio*

OSBORN



ONE of several types of Osborn Moulding Machines in operation at the foundry of Sperry Gyroscope Company is the Jolt, Rock-over, Pattern-draw machine shown above.

Noted for exact engineering and precise manufacture, Sperry products, including the big 60-inch searchlight below, must conform to rigid specifications of accuracy and uniformity.

Precision and Production—Advanced design, accuracy and rugged construction are Osborn standards that assure precise and uniform moulds, which contribute to sound and accurate castings. Smooth, swift operation permits production of such moulds in the volume needed to win the war, and with the economy needed to win the peace.

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue *Cleveland, Ohio*

OSBORN

MOULDING MACHINES

One Piece Forged Tool Steel

Moulders Tools

No. 1
SLICK & OVAL SPOON

Width	¾"	1"	1¼"	1½"
Each	$1.05	$1.15	$1.40	$1.55

No. 5
OVAL SPOON & TAPER SLICK

Width	¾"
Each	$1.15

No. 10
TAPER & SQUARE

Width	¾" Taper, ½" Square
Each	$1.15

No. 15
BENCH LIFTER

Width	¼"	½"	¾"
Each	$1.05	$1.15	$1.40

No. 40
STRAIGHT LIFTERS

Length	10"	12"	14"	16"	18"
Width—¼"	$1.05	$1.15	$1.20	$1.30	....
⅜"	1.05	1.15	1.20	1.30	....
½"	....	1.30	1.35	1.40	$1.55
¾"	....	1.40	1.50	1.60	1.75

Special Lifter, ½" wide x 24" long — $2.50

MOULDERS VENTING TOOL
For Steel and Semi-Steel Foundries.

Length	16"
Width—⅜"	$1.20
½"	1.35
¾"	1.50

ROUND FINISHING TROWEL

	6" long	7" long
Width—1½"	$1.80	$1.85
2"	....	1.90

SQUARE TROWEL

Width—1½" x 6"	$1.80
1½" x 7"	1.85
2" x 7"	1.90

Prices subject to change without notice. This is our complete line of tools. New tools will be added to this list when justified by demand. DELIVERY MADE IMMEDIATELY FROM STOCK.

THE FREEMAN SUPPLY COMPANY

PATTERN SHOP AND FOUNDRY SUPPLIES AND EQUIPMENT

TOLEDO, OHIO

Industry Needs Complete Co-operation In Tackling Postwar Problems

PROGRAM for the fifteenth annual meeting of the Gray Iron Founders' Society, held in Cincinnati Oct. 5 and 6, carried the following statement of purpose: "The Gray Iron Founders' Society Inc., is a co-operative organization safeguarding and promoting the interests of the gray iron foundry industry in the United States." This declaration is neither a boast nor an excessive display of altruism. Rather it is a realistic approach to the service which the society has rendered, especially during the war emergency, and to the place which it must occupy in the future if each individual gray iron foundry is to continue maximum service to the war and is to meet successfully the multiplicity of problems that must come with the peace.

On numerous occasions THE FOUNDRY has referred to the important contributions of the society in solving many of the problems associated with the relationship of gray iron castings to war production. Because the society during the past two years has provided intelligent, aggressive and militant leadership in both Washington and in the various foundry centers throughout the country, more gray iron is being used in the war effort today than seemed possible in that period before Pearl Harbor when the nation was beginning to prepare for an emergency which seemed inevitable. This leadership was quick to recognize the need for action and as a preliminary step, authorized the establishment of an office at Washington. Not only has this leadership helped materially in solving the problems of the moment, whether they pertained to the individual plant or the industry as a whole, but, perhaps even more important, has developed a confidence on the part of gray iron foundrymen far beyond anything of that nature previously experienced. At the same time, aggressive leadership of the society and the work of its officers and members has brought greater recognition of the worth of gray iron from various departments of the government. As a result, most gray iron foundries have been operating at an exceptionally high rate, as is shown by a record breaking production of approximately 14,500,000 tons of gray iron castings in 1942.

While the recent Cincinnati meeting considered carefully the various pressing problems now perplexing the industry, such as the shortage of manpower, labor relations, efficient operations, etc., considerable time was devoted to two important factors which need attention now in order to be effective in the postwar period. These have to do with market development and the institution of sound policies of cost determination and pricing throughout the industry, and they represent two major activities organized by the society during the past year. Concerted action in the matters of marketing and costs, and adequate attention to other problems as they develop, should permit the gray iron foundry industry to avoid many of the mistakes and disasters which followed the close of the last war.

A tremendous need for immediate help on the part of the individual foundry resulted in a remarkable growth in the membership of the society during the past two years. As the membership increased the society has gained greater authority as the spokesman for the entire gray iron foundry industry. As prestige has increased, government agencies have been willing to listen and co-operate; in many instances they have come to the society for help. As a result, the society has been able to render great service to both government and foundries in speeding production of gray iron castings for war. This accomplishment has created more enthusiasm on the part of the companies participating in this work, and quite naturally, more funds have been available for the work of the society. The upward spiral of service creating the means for greater service continues.

But the surface has only been scratched. Imagine what could be accomplished if the membership in the society could be doubled, if over half of the gray iron foundries of the nation representing 80 or 85 per cent of the productive capacity would unite in the common purpose of "safeguarding and promoting the interests of the gray iron foundry industry in the United States." For some years every gray iron foundry has benefited by the contributions in time, money and effort of the membership of the society. But the benefits would be so much greater to all if every company in the field would get on the bandwagon. If the lessons of history can be worth anything in depicting trends of the future, it seems apparent the need for co-operative action, as supplied by the society, will be much greater in the postwar period than it has been during the war emergency.

Frank G. Steinebach
Editor

CASTING NONFERROUS PARTS For Ordnance

By PAT DWYER
Engineering Editor
THE FOUNDRY

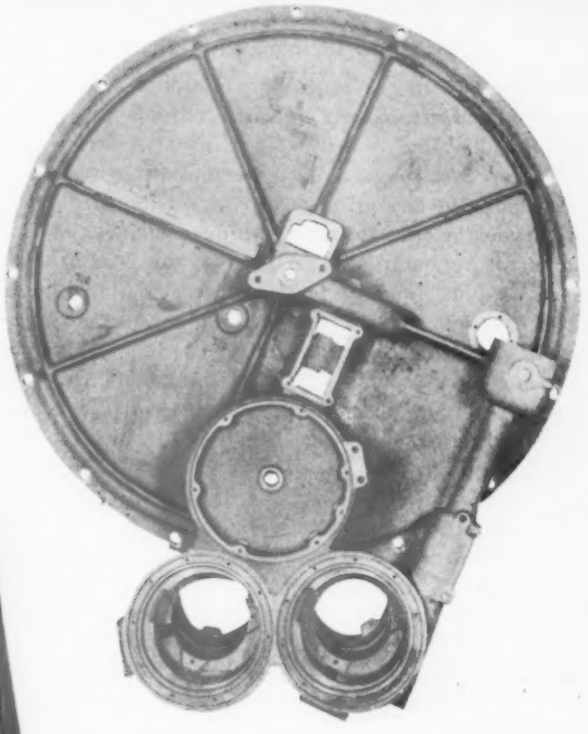
AFTER twenty odd years of building pumps of all descriptions, mostly for the navy and merchant marine, the Northern Pump Co., Minneapolis, caught up in the tornado of industrial expansion that swept the nation as a result of the war emergency, built a huge modern plant on the northern outskirts of the city to manufacture gun mounts for the navy—and incidentally to continue building the pumps which are as essential to the operation of a seagoing vessel as the heart, liver and lights and other forms of pumping apparatus are to the operation and continued existence of the human body. Marines, with typical disregard for the beautiful virtue of truth where a little exaggeration will add emphasis, have been heard to declare that a modern battleship is merely a shell designed to hold the greatest and widest variety of pumps ever assembled in any given space.

The fascinating and breath-taking story of how the plant was built in the dead of a Minnesota winter, equipped, staffed and placed in operation months ahead of schedule, of how work ceased in the old plant and was taken up in the new plant without an hour's loss of production, of how gun mounts were completed and shipped to the seaboard before contracts actually were signed for their construction, and dozens of other remarkable features, have formed the subject of articles in national magazines and newspapers. The plain, common-sense, red-tape-cutting and highly unorthodox ideas and methods of president John B. Hawley Jr., induce heart failure in traditionally cautious financial circles. According to his expressed views this is no time for caution or dilly-dallying. He is an ardent disciple of the famous homespun military genius who said that the only way to win a battle is to get there "fustest with the mostest."

In keeping with the swing to ordnance production the title of the company has been changed to Northern Ordnance Inc. The former staff of between 200 and 300 in the old plant has been increased to 8000 in the new plant and further expansion is in progress. A tour of the entire plant with its miles of smooth concrete floors and wide gangways would tax the endurance of a letter carrier. Messengers and material chasers dash through the various departments on bicycles.

However, do not be alarmed. We are not going for a tour of the entire plant either by foot or mounted on bicycles. The present description will be confined to that section of the plant devoted to nonferrous foundry activities. This building of light-colored brick and steel, amply lighted by windows in the walls and high roof, encloses a floor space 120 x 380 feet, divided by two rows of columns into three longitudinal bays, each 40 feet in width. The building is heated by steam.

On a par with all other departments in this highly modern plant, the foundry is equipped with all the appliances considered necessary in the production of castings that must pass the most rigorous inspection and conform to close and rigid specifications in dimensions, appearance, chemical and physical properties. Close check is exercised over all materials and methods involved in the pro-



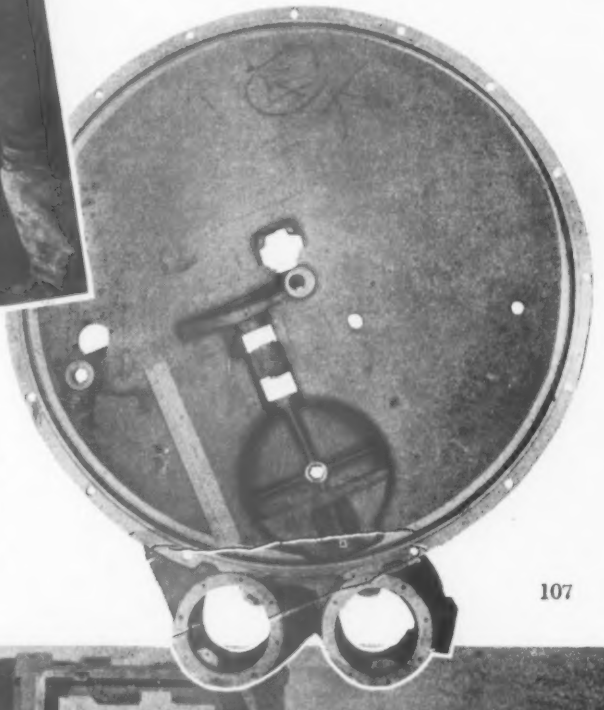
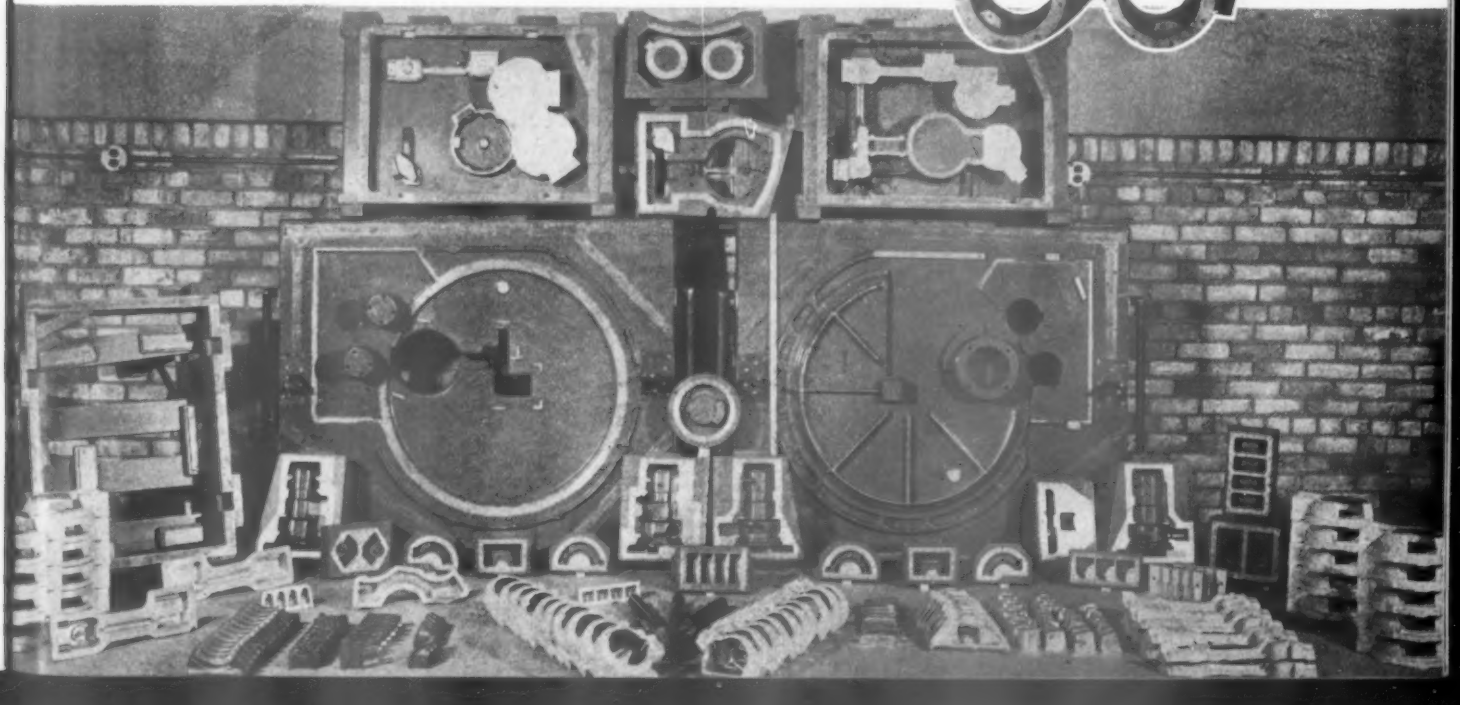


Fig. 1 (Upper left)—General view of the foundry looking down the center bay. Fig. 2 (Above)—Molten bronze is poured from the electric furnace into the pouring ladle resting on a small truck. Fig. 3 (Above right)—Front view of a large compl:cated casting. Fig. 4 (Right)—Back view of same casting. Fig. 5 (Below)—Complete pattern and corebox equipment for producing the casting



duction of castings. For example, molding sand is tested every day for moisture content, permeability, grain size and bond. Sand heaps in different parts of the shop are made up according to definite standards to suit the castings made in any given area. Molds for small and medium weight castings are made on machines. Molds for large castings are made in flasks on the floor in the ordinary jobbing foundry manner by several highly skilled and experienced molders. With the exception of space at the west end of the foundry devoted to coremaking, and a somewhat similar space at the other end where the melting furnaces are located, molds are made, poured and shaken out on the greater part of the floor space in all three bays.

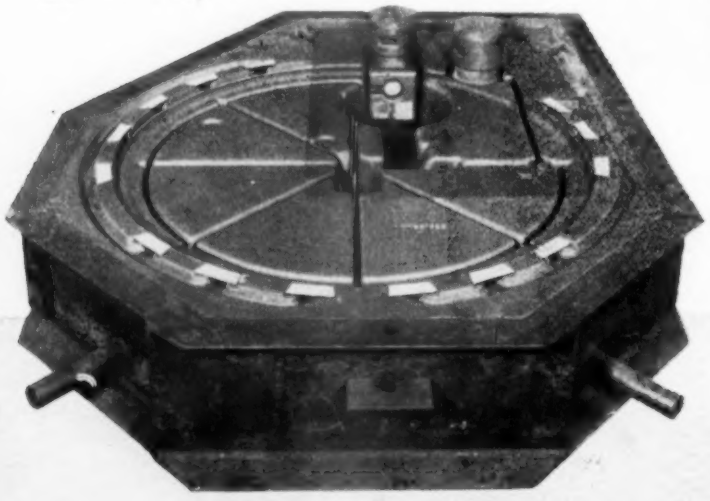
Castings are collected from the various molding areas and trucked to the cleaning department in the south bay. This department is equipped with a sandblast chamber, sprue cutters, grinding machines and other necessary devices for getting the castings into proper condition for removal to the machine and assembling departments of the plant. Cores are knocked out of small and large castings and the sand is gathered up periodically and trucked to the dumping place in the yard. An excellent grade of core sand from a local deposit is available, therefore no attempt is made to reclaim any sand at the shakeout. All cores are made from new sand bonded principally with oil. In certain instances to meet special conditions, pitch base or cereal binders are employed either alone or in combination with oil.

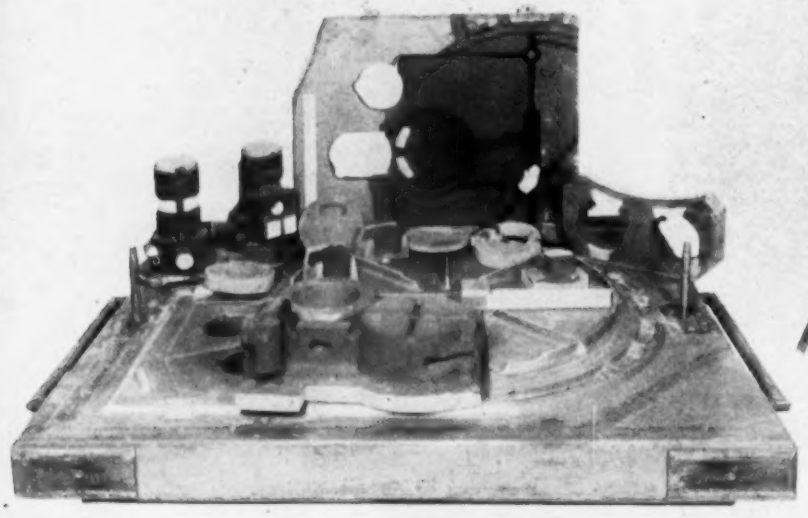
Where casting conditions are unusually severe, powdered iron oxide is added to the core sand mixture to prevent *eating in* or *whiskering*—that is, penetration of metal into the core, particularly where heavy metal sections surround thin cores. It is claimed that some of the benefit derived from the use of iron oxide is due to the fine grain of the material which closes openings between the sand grains and thus prevents metal penetration. Beyond any doubt, a great deal of the benefit is due to the fact that the oxide has a chilling effect on the metal coming in contact with it. The first film of metal solidifies before it can penetrate the core. As small an amount as 2 per cent of iron oxide to 98 per cent silica sand will act as a chill.

Ovens Fired with Butane Gas

Green cores are loaded on portable racks and dried in a battery of five ovens fired with butane gas. This type of gas is used in several melting furnaces in the foundry and also used extensively for many other purposes throughout the plant. It is claimed that it contains 1000 B.t.u. per cubic foot as compared with the average 500 B.t.u. in natural gas. The burner and fans are mounted on the roof of the oven. Shutters over rows of openings in the inner wall of the oven may be adjusted to insure uniform temperature in all parts of the oven, irrespective of variation in the total load of cores on the rack. Temperature is under automatic thermostatic control and charts are taken on a recording type pyrometer.

With the demand for castings far exceeding the capacity of the foundry, a considerable number are subcontracted to outside foundries. So far as possible these castings are confined to the simpler shapes. The really difficult castings, the so-called *wild cats*—castings that tax the highest degree of skill and ingenuity on the part of melter, molder and coremaker—are made in the foundry





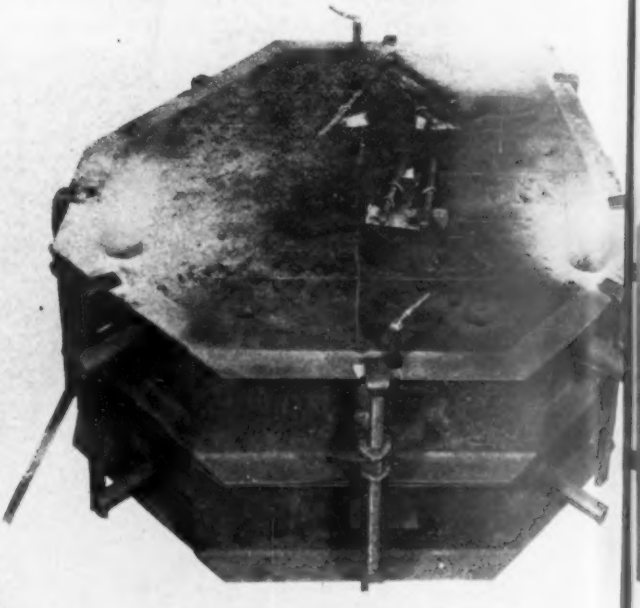


Fig. 6 (Left)—Completed drag half of mold for disk casting. Fig. 7 (Left below)—Drag pattern with complete set of cores. Fig. 8 (Below)—View of closed mold showing position of sprues, vents, and rods supporting cope cores

managed by J. W. Bryant. In many instances a considerable amount of experimental work is carried on before a satisfactory technique is established. The shop is new. There is no skimping on materials or equipment. The managerial policy is broad and liberal with only one aim, the production of perfect castings.

Although several hundred duplicates of the casting shown front and back in Figs. 3 and 4 have been produced satisfactorily, the problem was not licked in three easy lessons. The solution to the problem came through a combination of patience and perseverance, plus a liberal application of that intangible sixth sense which master foundrymen develop from close observation and long years of study and experience.

As a news item it might be interesting to comment on the part the casting is to play in the final assembly. From the foundry viewpoint that factor is immaterial. As a general rule a foundryman does not care whether his castings are for use in the heavens above, the earth beneath or the waters under the earth. When they pass the final inspection, he is through with them. In the present instance, in addition to the foregoing, the purpose of the casting is included in the list of items that are not mentioned publicly. Guv'ment Work!

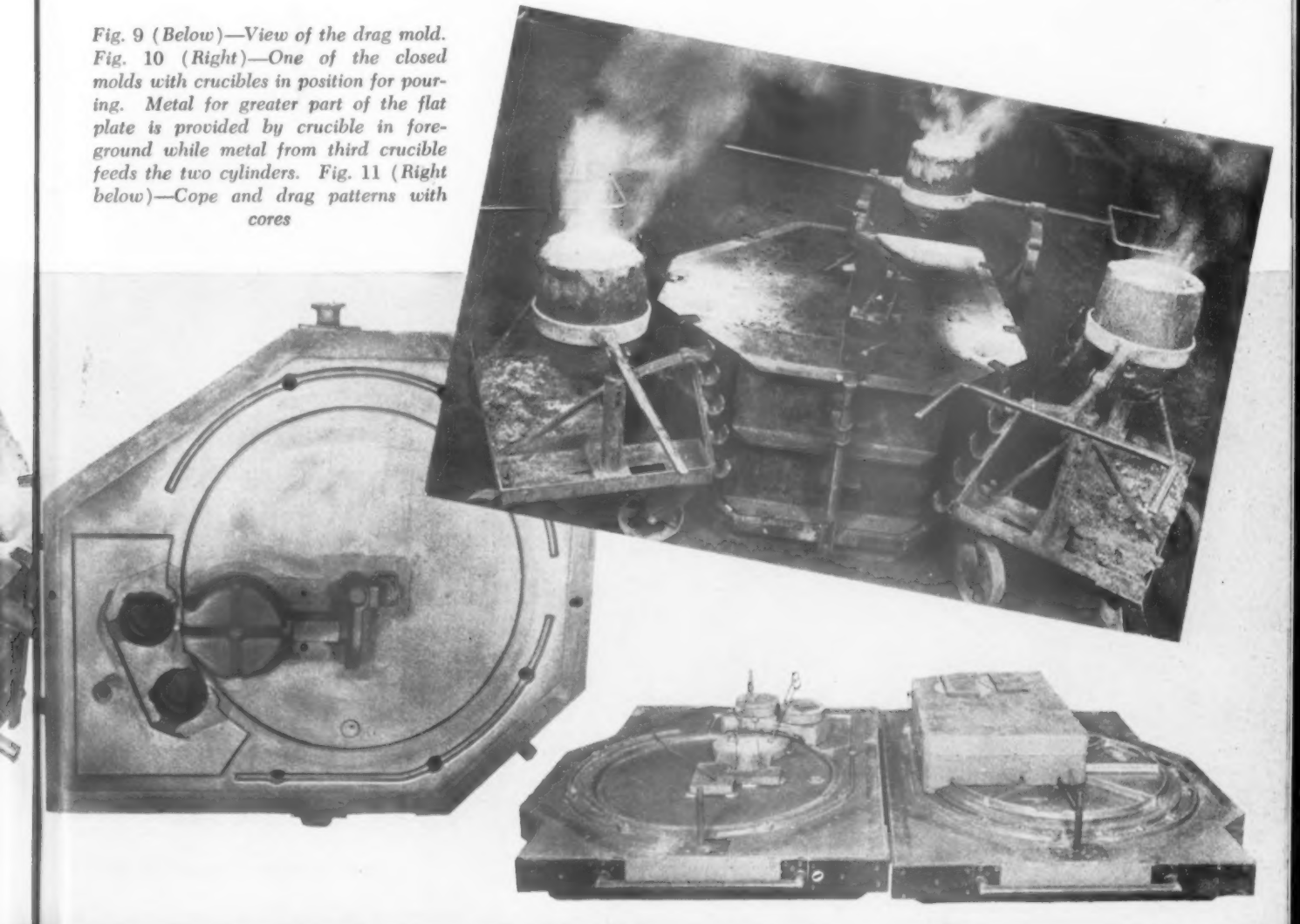
This large bronze disk approximately 3 feet in diameter, average metal thickness ½-inch and carrying ribs, rings, bosses, lugs and cylinders, is machined extensively and therefore must be clean and perfectly solid throughout. In addition, the machined areas must bear exact dimensional relationship to each other within microscopic tolerances. The casting must be free from warps, strains or twists and perfectly flat without benefit of heat treating or pressing. Patterns, coreboxes, other equipment and methods developed to produce castings to meet the rigid specifications are shown in several of the accompanying illustrations.

Elaborate Equipment Is Employed

Complete and elaborate pattern and corebox equipment is shown in Fig. 5 with the core driers in the foreground. Metal strikeoff faces on the wood coreboxes insure accuracy for a prolonged period. The jig or frame shown standing at the extreme left is used for rubbing or fitting the two halves of the main body core. Obviously the equipment cost would be prohibitive if only one or two castings were required, but it is negligible in the present instance where the order for castings runs into thousands and where three molders make 8 castings per day.

Fig. 7 shows the drag pattern with complete set of cores. White areas on the two upright cylinder cores in the left background, the main body core, center back and cheek core, and right back indicate cast iron chills. These chills promote directional cooling to hasten solidification of the metal in relatively heavy sections of the casting. Because of the location of these heavy sections it is impossible to provide risers or feeders that would feed them adequately. Properly speaking, the term core should be applied only to a body of dried sand forming a cavity in a casting. However, foundry (*Please turn to page* 196)

Fig. 9 (*Below*)—*View of the drag mold.* *Fig.* 10 (*Right*)—*One of the closed molds with crucibles in position for pouring. Metal for greater part of the flat plate is provided by crucible in foreground while metal from third crucible feeds the two cylinders.* *Fig.* 11 (*Right below*)—*Cope and drag patterns with cores*



Modern Methods IN CASTING MAGNESIUM

By F. A. FOXALL
Assistant Manager of Foundries
Eclipse-Pioneer Division
Bendix Aviation Corp.
Teterboro, N. J.

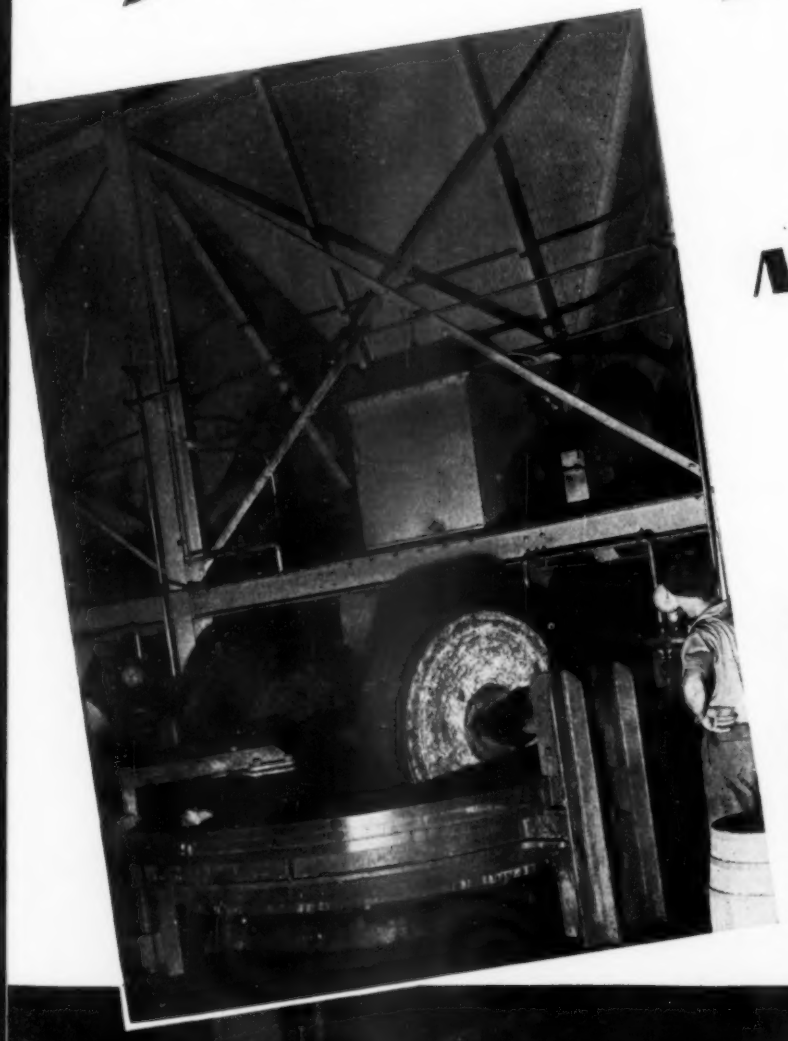


Fig. 1 (Upper left)—Considerable care must be taken in the preparation of the molding sand for magnesium castings, and it must be mixed thoroughly to insure proper distribution of ingredients. Fig. 2 (Left)—Sand from the overhead conveyor belt is distributed to the desired hoppers over the molding machines. Fig. 3 (Above)—The author of the article

THE WAR EFFORT has brought forth a tremendous demand for magnesium castings, principally in aircraft work where highest quality and strength are required. Sand cast foundries that were in existence prior to the emergency programs were doing a good job of meeting peacetime requirements, but these same foundries found themselves handicapped by insufficient capacities to meet the requirements of a world at war. As a consequence, many people who had never worked with magnesium alloys now find themselves in the middle of the magnesium industry. Companies producing other types of castings are turning to the production of magnesium sand castings.

These new requirements have created a need for information regarding the layout, equipping and operating of magnesium foundries. In designing and laying out a magnesium foundry, the usual procedure is first to arrive at the estimated shipping weight of castings per month. Then the floor space for each department and the equipment in each department must be selected, depending upon the type of work and making due allowance for rejects within the foundry, so that this amount of production can be handled.

The foundry that knows or has a definite idea of the type of work that is to be manufactured is fortunate indeed, because then the equipment and space can be determined and provided for each definite job. Without knowing definitely the type of work and quantities of each type of work, it will be necessary to proceed solely on an estimate of the type and kind of work that will be manufactured.

Opinion varies widely as to the pounds of finished magnesium castings that can be manufactured per month per square feet of floor space. These figures will vary roughly from 3 pounds to 8 pounds per square foot, depending upon whether the castings are large or small, light or heavy, and whether they are plain castings or intricate in design.

In talking about foundry layout, we will proceed from the point of origin of the castings, i.e., from the receiving of materials, through the various phases of manufacture, until the castings leave through the shipping department.

The many successive operations that must be performed to produce a quality magnesium sand casting include incoming sand handling, (molding sand and core sands), core and mixing, core making, core baking, core spraying, core cleaning and core assembling, melting, pouring, sand shakeout, cutting off gates and risers, sandblasting, rough inspection, grinding, snagging, pressure testing, burring, buffing, filing, inspection, heat treating, sandblasting, plating, final inspection and shipping.

Sand Handling Equipment Important

One of the prime considerations in foundries where several types of sands are used is sand storage and methods of handling sand. Sand handling equipment should be chosen with care, so as to make the greatest possible savings in labor and time in unloading sand cars and getting the sand into the bin. Car unloading buckets, lilt elevators and belt conveyors comprise the most common types of equipment for that purpose. Car unloading buckets are metal scoops which are power operated through a series of motor-driven cables. The operator can reach all sections of a car, and the power scoops pour the sand down a trough into the sand bins. Lift elevators can be used where the sand is dumped through the bottom of the car into a hopper. The elevators lilt the sand up overhead and drop it into sand storage bins. Belt conveyors can be of any design consistent with the design of the foundry, so that the sand can be dumped on the conveyor and moved to the bins.

The next step is the core department. Common error in the design of magnesium foundries is in making the core shops too small. Especially is this true if large intricate castings for large air- (*Please turn to page* 166)

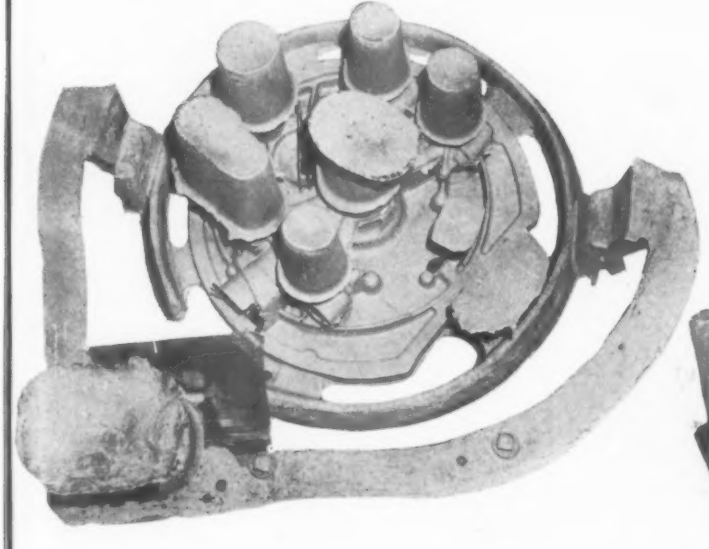


Fig. 4—Top view of a casting with gates and risers attached. On this a single sprue feeds two branch runners through a metal skimming screen. The branch runners in turn feed a ring gate that almost encompasses the casting

Fig. 5 (Below)—This rather forbidding array shows the multiplicity of gates and risers required to insure a sound casting which will meet the requirements. Due to the high shrinkage, light weight and low heat content of magnesium more gates and risers are needed than with ferrous alloys. Also the magnesium must enter the mold without turbulence, and usually the gates enter the bottom of the cavity

GRAY IR

IRON FOUNDERS

Study War and Postwar Problems

MORE than 200 members of the Gray Iron Founders' Society met in Cincinnati, Oct. 5-6, to consider the various problems incident to wartime operations and to discuss means of placing the gray iron foundry industry in a better position to meet the competition of the postwar period.

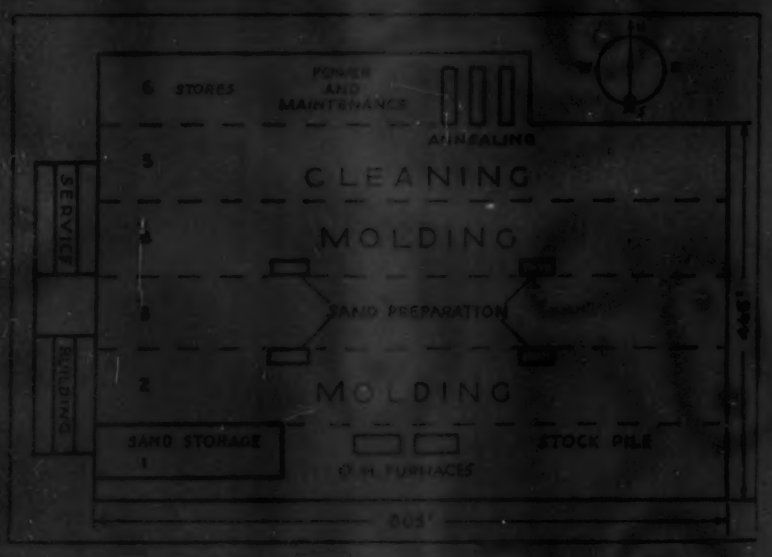
This war council and fifteenth annual meeting not only marked a new high in attendance at the yearly conference, but it also disclosed further growth in the influence of the society in the ferrous foundry field. Total membership, as announced by W. W. Rose, executive vice president, at the annual business meeting, now exceeds 700, an increase of approximately 125 during the past 12 months. These companies represent the large majority of the nation's gray iron foundry capacity.

A. C. Denison, 1942-43 president of the Gray Iron Founders' Society; Frank W. Boykin, member of Congress from Alabama, a speaker at the meeting; W. W. Rose, executive vice president of the society

Walter L. Seelbach, secretary-treasurer, the Forest City Foundries Co., Cleveland, was elected president of the society for 1943-44. He succeeds A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland. Other new officers chosen by the board of directors include: Vice president, H. L. Edinger, vice president in charge of sales, Barnett Foundry & Machine Co., Irvington, N. J.; secretary, F. H. Rayfield, vice president, Potter & Rayfield Inc., Atlanta; treasurer, George Walton, president, the Madison Foundry Co., Cleveland. W. W. Rose continues as the executive vice president of the organization.

Six new directors were elected. They are: C. R. Culling, president, Carondelet Foundry Co., St. Louis; R. E. Kucher, vice president, Olympic Foundry Co., Seattle; S. C. Mefford, treasurer, Auburn Foundry Inc., Auburn, Ind.; R. D. Phelps, president, Francis & Nygren Foundry Co., Chicago; E. L. Roth, president, Motor Castings Co., Milwaukee; and Mr. Seelbach.

While the subject of manpower—today's major operating problem of most gray iron foundries—entered into considerable of the meeting's discussions, a large part of the meeting was devoted to problems of prewar origin which call for solution if future progress of the industry is to be realized. Chief of these latter subjects were market development, and the institution of sound policies in cost determination and pric- (*Please turn to page* 203)



New Steel Foundry Makes NAVY CASTINGS

By PAT DWYER
Engineering Editor
THE FOUNDRY

ADOPTION several years ago of the Randupson process, a radical departure from the formerly standardized methods of making molds for steel castings, and the recent erection of a magnificent new building, are characteristic of the policy of a company and a family of iron masters prominently identified with the iron history of eastern Pennsylvania almost from the days of William Penn.

In 1733 young William Bird, recently arrived from England, was cutting wood for use at Thomas Rutter's Pine Forge for 2 shillings and 9 pence per day. Ten years later he was renting one-eighth of Pine Forge at 40 pounds per year. William Bird, for whom the borough of Birdsboro is named, built this first forge adjacent to land originally purchased by Caleb Harrison from John, Thomas and Richard Penn.

The deed conveying the property gives "said Caleb Harrison, his heirs and assigns free leave, right and liberty to hawk, hunt, fish and fowl in and upon the hereby granted lands and premises." Further: "Harrison was to be beholden of us our heirs and successors, proprietaries of Pennsylvania, as of the manor of Conestogoe in the county of Lancaster in free and common socage by fealty only in lieu of all other services yielding and paying, therefore, yearly to us, our heirs and successors at the town of Lancaster upon the first day of March in each year one half penny Sterling for every acre of the same."

In well informed circles it is generally understood that the price of the present property on which the new foundry is erected, was considerably above that figure.

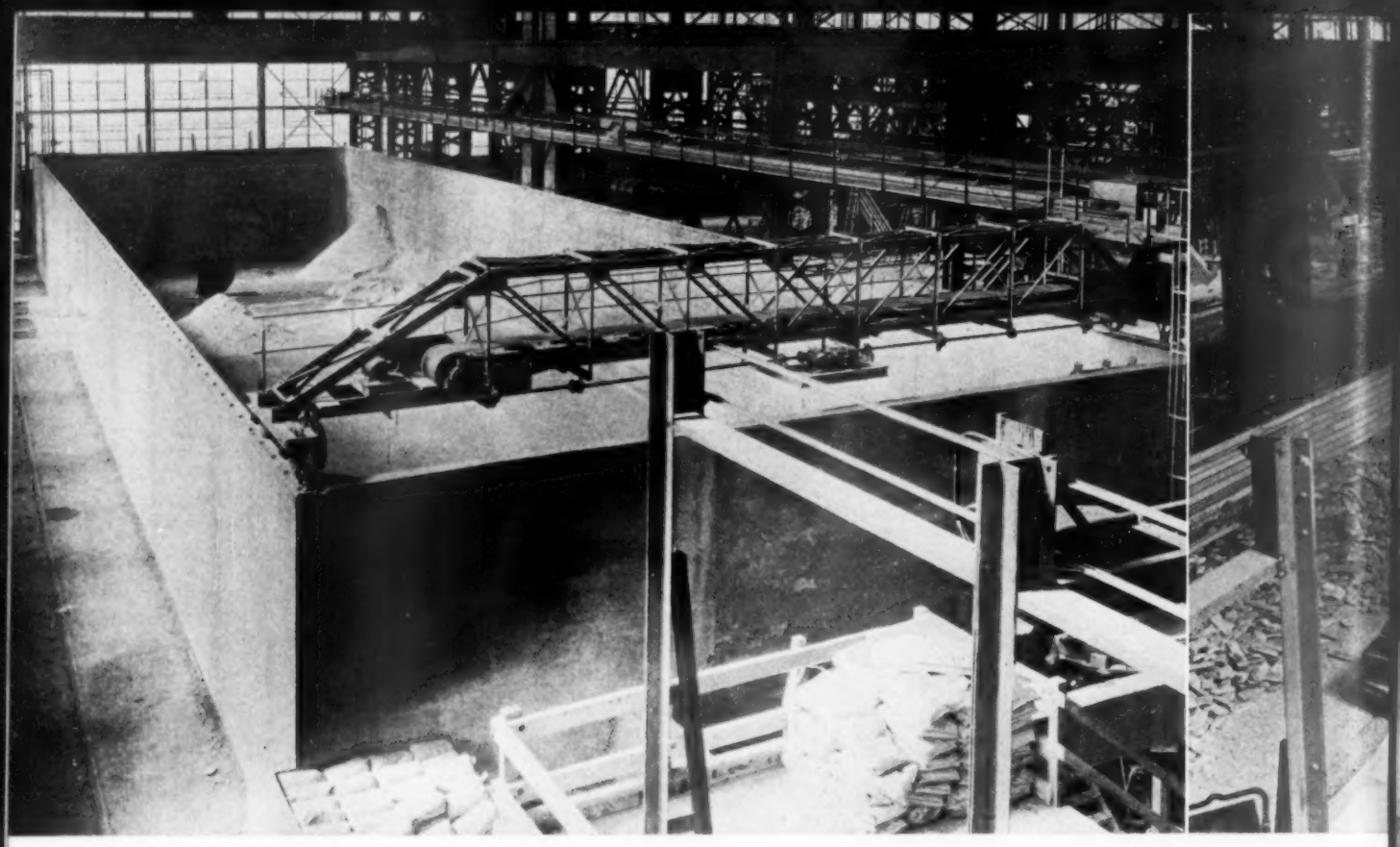
When William Bird died in 1761, operation of his various properties, holdings and industrial enterprises was taken over by his son Mark Bird and by his widow who afterward married the iron master John Patton. He built the Hopewell furnace in 1770. At Birdsboro about the time of the Revolution he built a rolling mill, a slitting mill and a nail factory, probably the first in this country. He built Spring Forge in Oley township and the Gibraltar forges in Robeson. At Trenton, N. J., he manufactured wire. He increased his land holdings to over 8500 acres.

In August, 1776, Colonel Mark Bird fitted out 300 of his men with uniforms, tents and provisions at his own expense. He went to the relief of Washington soon after the battle of Brandywine. At his furnaces he cast cannon and ammunition for the Continental army. After the war he went broke like many other patriots before and since. The Hopewell furnace and the large acreage of woodland was purchased by Matthew Brooke, Thomas Brooke and Daniel Buckley. In 1837 the management was taken over by Matthew Brooke's sons Edward and George under the firm name of E. & G. Brooke and was continued under this name until 1880 when the firm was incorporated as the E. & G. Brooke Iron Co.

The Birdsboro Iron Foundry Co., originally a joint stock association, began with a small foundry in 1867. In 1894 the company was taken over by the Brooke in-

Fig.
Fig.
naces
Fig.
Sand
along
shake

Fig. 1 (Upper left)—Sketch showing general arrangement of foundry. Fig. 2 (Center above)—View at back or tapping side of open hearth furnaces. Fig. 3 (Upper right)—Front or charging side of melting furnaces. Fig. 4 (Right)—Sand mulling units for preparing mold and core sand. Sand storage tanks are located above the mullers. Fig. 5 (Below)—View along No. 2 bay where a wide variety of castings is molded, poured and shaken out. Melting furnaces are located behind the ladles shown in right background



terests. The name was changed to Birdsboro Steel Foundry & Machine Co., in 1906. Additions and improvements over a period of years culminated in a large plant with a monthly capacity of 2500 tons of steel castings, also a roll foundry, and large machine and erection shops. The Randupson process of making molds for steel castings was introduced in 1935 and was described in a series of articles in the December, 1935, and January, February and March, 1936, issues of THE FOUNDRY.

Erect Large Capacity Foundry

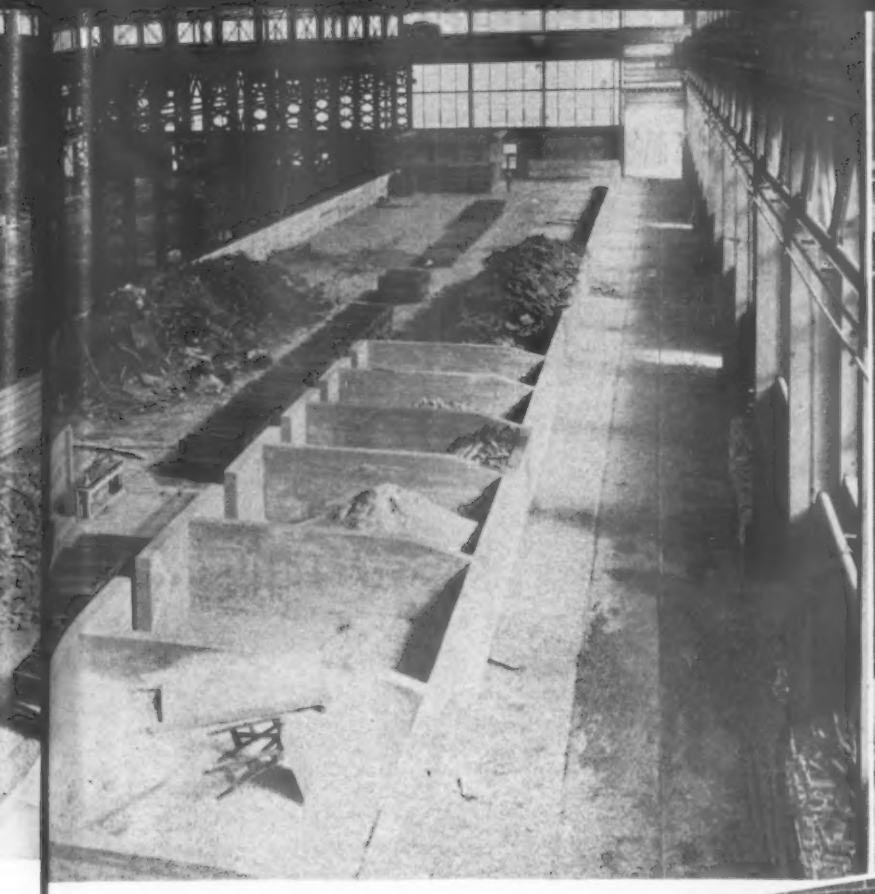
With the plant running to capacity and with the laudable desire of doing its share to meet the War Department's urgent and incessant demand for more and more steel castings, the management of the Birdsboro Steel Foundry & Machine Co. decided to erect a large modern steel foundry with a potential capacity of approximately 3000 tons per month. The plant was financed by the U. S. Navy and is operated by the company under lease. Practically all the castings are for the Navy and range in weight from 1 to 70 tons. In the meantime the old foundry is engaged to full capacity in the production of a wide variety of miscellaneous steel castings. In the old foundry the metal is melted in one 25-ton and two 30-ton acid lined, oil fired open-hearth furnaces. In the new foundry the metal is melted in two 50-ton basic lined, oil fired furnaces.

In this hilly, densely wooded and picturesque section of eastern Pennsylvania through which the Schuylkill, black as ink and heavily impregnated with silt from the anthracite mines to the north, slowly wriggles its way to a junction with the Delaware in Philadelphia, a large, level farm area was selected for the erection of the new plant. The site is a scant half mile from the old plant to which it is connected by railroad and by a wide paved road. Wide experience over a period of many years provided the management with the necessary knowledge to plan and design a foundry in accordance with the latest improved modern ideas on the subject. Lighting, heating, ventilation, employe welfare and good housekeeping are exemplified to a remarkable degree. Ample room, and wide, straight, clean and level concrete gangways eliminate the curse of congestion and crowding that has afflicted foundries, particularly heavy work jobbing foundries, for centuries.

The steel frame and reinforced concrete building, 465 x 805 feet, covering almost 10 acres on an 85-acre tract and extending approximately east and west, is laid out in a series of five longitudinal bays separated by rows of steel columns which support the exceptionally high saw tooth roof and the crane runways. In addition to the five uniform bays an auxiliary department, 50 x 600 feet, flanks the main building on the north side. A two-story edifice occupies space at the front or west end of the main building. The entire building is a self contained unit which houses every activity and all the materials and equipment required in the production of steel castings. Even such bulky raw materials as sand, pig iron and scrap usually stored outside, are stored inside the new building.

Auxiliary units include a personnel or service building, pattern shop, guard house, acetylene generator building, fuel oil heating, boiler and pump house for furnaces and annealers, spray pond, two 50,000-gallon water tanks, three 75,000-gallon oil tanks, one underground 25,000-gallon oil tank, garage, emergency pump house and sewage disposal plant. Overall height of the building is 65 feet. The greater part of the floor in the main building is hard clay, with wide concrete gangways extending through the center of each bay. Transverse gangways at the ends and in the center facilitate transportation of materials from one bay to another.

Before taking up the various departments in detail it



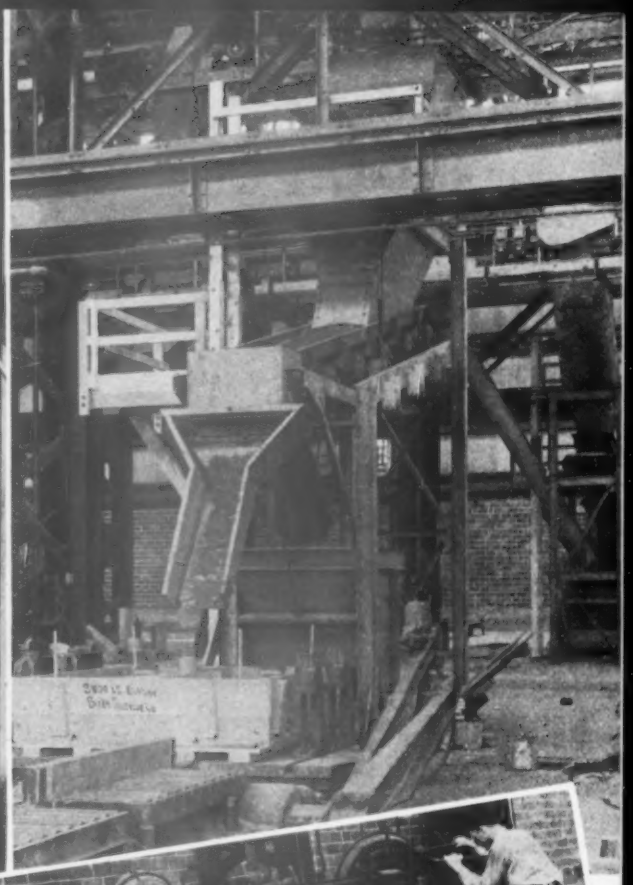


Fig. 6 (Upper left)—Sand storage pit with traveling belt conveyor mounted on top. Fig. 7 (Center above)—All raw materials such as pig iron and scrap are stored inside the building. Fig. 8 (Right above)—Sand from an overhead hopper drops onto a vibrating screen and thence into a chute which fills the flask on the large jolt rollover machine. Fig. 9 (Right)—Grinding a stern frame. Fig. 10 (Right below)—View in pattern shop. Fig. 11 (Bottom right)—View of washroom

may be advisable to present a brief general description of the layout as shown in the accompanying free hand sketch not drawn to scale. The center bay, No. 3, is devoted principally to the production and assembly of small and medium size cores. The bays on either side of the center, that is Nos. 2 and 4, are almost duplicates of each other in equipment, floor, pits and cranes. A wide variety of castings is molded, poured and shaken out in this area. Steel is melted in two oil fired, 50-ton open-hearth furnaces on a mezzanine floor near the center of the south or No. 1 bay. The tapping spouts project into No. 2 bay and a transfer car mounted on a transverse track carries the ladle when necessary to bay No. 4. Castings are chipped, cleaned and rigidly inspected in No. 5 bay into which they are carried on a transfer car.

Main entrance to the foundry is a wide passageway through the first story of the service building. The upper story is equipped as a cafeteria where excellent food in wide variety is served the em- (*Please turn to page* 194)

Electric Steel Making Conference Attracts Interest

Chairmen of sessions included, left to right: Fred B. Riggan, Charles W. Briggs, Fred A. Melmoth, G. A. Lilleqvist and R. H. Frank. Photos courtesy of R. H. Jacoby, Key Co., East St. Louis, Ill.

WITH attendance over 450, the first conference of the Electric Furnace Steel Committee, Iron and Steel Division, American Institute of Mining and Metallurgical Engineers, was held at the William Penn hotel, Pittsburgh, on Oct. 1 and 2. The two-day session was divided into three sections comprising joint meetings for general discussion of basic and acid electric steel problems, and separate meetings on acid and basic practices. The joint meetings occupied both morning and afternoon of the first day, Oct. 1 while the sessions on acid and basic practice were held simultaneously during the second day, Oct. 2.

Theme of the conference was "A United Effort for Wartime Production of Electric Furnace Steel", and the meeting was arranged by Charles W. Briggs, Steel Founders' Society of America, Cleveland, and chairman of the conference committee, and Harry W. McQuaid, Republic Steel Corp., Cleveland, and chairman of the executive committee. First session comprised a joint meeting on electric furnaces in which such phases as development and present status of the electric furnace steel industry, the design of electric melting furnaces and shortcomings of modern electric melting furnaces were discussed by a number of speakers.

Chairman of the meeting was Norman I. Stotz, Universal-Cyclops Steel Corp., and Dr. Harry A. Schwartz, National Malleable & Steel Casting Co., was co-chairman. In welcoming those attending the meeting C. W. Briggs pointed out that a great need exists for a united effort in electric steel making, and more particularly there is a dearth of published information on the subject. As a result a firm engaging in electric steel making for the first time, or a new operator, had considerable difficulty in obtaining worthwhile data on developments and trends in electric steel melting. He also mentioned that since the discussions presented at the meeting would later be available in printed form, completeness of the subject would be insured by inclusion of historical information. Harry McQuaid then spoke briefly on the object of the conference pointing out that the more discussion from the floor, the greater the benefit to all present.

During the session it was pointed out that of the 344 steel foundries in this country 276 employed electric furnace melting units, using 508 furnaces. The furnaces have an average annual capacity of 2,200,000 tons of steel. The ingot steel industry included 68 electric furnace plants using 201 electric furnaces with capacities ranging up to 80 tons with an annual capacity of 6,100,000 tons of steel. Considerable mechanical and electrical improvement has been made in electric arc furnaces. It was stated that the rotary type of regulator for the electrodes gives good results particularly during the meltdown period with some reduction in power cost. Power input is important since it has a relationship to power factor. Hence, it is advisable to select the proper secondary voltage to secure the highest power factor with the highest energy or power input. While it is possible to increase power input at the (*Please turn to page* 169)

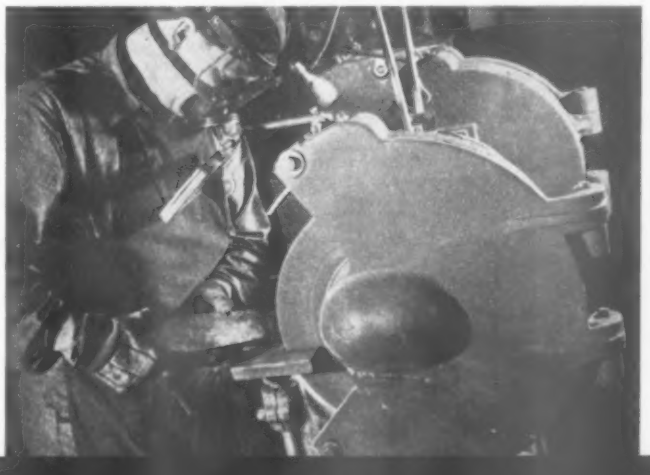
Snagging Castings

By G. S. EISAMAN
Carborundum Co., Niagara Falls, N. Y.

ORDINARILY, the first operation in foundry cleaning is to remove sprues, gates and risers. This is done by breaking with a hammer, cutting with a torch, sawing, or cutting with a thin abrasive wheel. The next operation is to grind off the remaining stubs, the parting lines and the fins, to smooth off undesirable rough surfaces, and occasionally to rough grind a flat surface, as on the mating sides of radiator sections. In general, these operations are termed *snagging*. Essentially it is a material removing operation, the finish requirements usually being negligible.

Depending upon the size and design of the casting, one of three types of machine is used, namely swing frame, floor or bench type, and portable. In none of these is the wheel brought to work by machine movements. All feeds are by hand. The entire machine may be fed to the work, as with swing frame and portable machines, or the work may be fed to the wheel, as with bench and floor stand machines.

Swing frame machines are used for grinding castings which are too large to be moved against the wheel by hand, or supported by a chain hoist. They are moved only to present new surfaces to the wheel. Essentially, a swing frame machine consists of a horizontal frame with a motor on the rear end which drives the wheel on the front end through gears or belts. The machine usually is hung from an overhead suspension or monorail trolley, so that the wheel can readily be moved forward, backward, sideways, or tilted from the vertical plane by means of handles which project in front of the wheel. Production of a swing frame machine depends considerably upon whether its design permits fast and easy handling.



Wheels commonly used on swing frame machines are of 16, 18, 20, or 24-inch diameter. The better machines have two or more speeds so that as the diameter of the wheel is reduced by wear, the speed in surface feet per minute can be maintained by stepping up the revolutions per minute.

Floor stand and bench stand grinders are similar in construction. Both consist of a fixed upright base or pedestal, the first of course being high enough to permit the machine to be installed on the floor. Each has a grinding wheel spindle either direct or belt driven, and generally mounting a grinding wheel at each end. Usually the grinding wheel is the Type 1 straight wheel.

Castings usually are brought to the wheel by hand, or if somewhat too heavy for that, by chain hoists. These machines are widely used for production snagging of light and medium weight castings.

Portable snagging grinders are light machines driven by air, flexible shaft, or self contained motor. They are used to grind surfaces which are inaccessible to ordinary machines, to remove small amounts of stock at widely separated points on large castings, to blend curved surfaces and fillets with straight surfaces, etc. Portable machines are used with straight wheels, cup wheels, or cone-shaped wheels. Probably the most commonly used straight wheels are 6 inches in diameter by 1 inch thick and 8 inches in diameter by 1 inch thick. Vertical head portables mounting cup wheels are used chiefly for providing smooth surfaces for paint-

ing or lacquering. Six inch diameter by 1½-inch (or 2-inch) x ⅝-inch straight or flaring cup wheels commonly are used. Flexible sanding disks of 7 or 9 inches in diameter also are often used on portable machines for that purpose.

Principal uses of cone-shaped wheels are for smoothing the inside surfaces of hollow castings which could not be reached in any other way and for grinding small radii uses. A typical job is grinding the webs of pulley and fly-wheel castings.

Disk and cylinder wheel grinders may be used for precision grinding. However, they often are used in the foundry for what might be called semiprecision snagging.

One type of machine which can mount either a cylinder wheel or a disk wheel (on which the grinding is done on the side of the wheel instead of the periphery) has a horizontal spindle and is equipped with a work table. The work is fed by hand with a lateral movement across the face of the wheel.

A special type of machine of this sort is used for grinding the flat sides of radiator sections. It consists of two disk wheels in a vertical plane. The section is passed between the wheels so that both sides are ground at once, which is not only economical, but insures parallelism. The work may be fed by hand or by machine movement. This type of machine can be used for any casting which must have parallel sides.

Another type of disk grinder which has its uses in some foundries consists of a vertical spindle mounting a wheel in the horizontal plane. A casting which must have a flat side is placed on the wheel. The feed into the wheel is merely due to the pressure caused by the force of gravity—that is by the weight of the piece. The casting is kept from revolving with the wheel by a suitable holder — sometimes simply a bar across the wheel, high enough to prevent contact with the wheel and low enough to hold the casting stationary.

Many foundries use special machines where the production of a certain type of casting is sufficient to warrant application. An example is one for grinding cast pipe internally. The machine mounts a wheel on a long spindle, and is usually suspended (*Please turn to page* 173)

Wheel Recommendations for Snagging Operations

Class of Work	Abrasive Material and Bond Type	Grain Size and Grade: Coarse grain Hard grade	Medium grain Medium grade	Fine grain Soft grade
Aluminum & Aluminum Alloys				
Operating Speed				
5000 to 6000 s.f.p.m.	Silicon carbide Vit.	20-H	24-I	36-J
	Aluminum oxide Shel.	20-2	30-2	60-2
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.	163D-9	243-10	303-12
	Silicon carbide Res.	163D-9	243-10	303-12
Bath Tubs	Silicon carbide Vit.	16-G+	20-G+	24-G+
	Silicon carbide Vit.	16-H	20-G+	24-G+
	Silicon carbide Vit.		20-H	24-H
Brake Shoes (Chilled Iron)	Silicon carbide Vit.	16-G+	20-G+	
Brass				
Wheels over 12-inch dia.	Silicon carbide Vit.	16-H+	20-H	24-H
Wheels under 12-inch dia.	Silicon carbide Vit.	30-I	30-I	50-J
Brick (Vitrified)	Silicon carbide Vit.	14-H	14-I	16-J
Bronze (Hard)	Aluminum oxide Vit.	16-G	20-G	24-H
Cast Iron	Silicon carbide Vit.	14-G+	16-G+	20-G+
	Silicon carbide Vit.		16-H	20-H
Chain Links				
(Malleable Iron & Steel)	Aluminum oxide Vit.		24-F	30-F
	Aluminum oxide Vit.	24-DD-F	30DD-F	
Chilled Iron	Silicon carbide Vit.	16-G+	20-G+	24-G+
	Silicon carbide Vit.	16-H	20-H	24-H
Couplers & Draw Bars	Aluminum oxide Vit.	121-G	121-G	14-G
Crankshaft (Balancing)				
Operating Speed				
5500 to 6000 s.f.p.m.	Aluminum oxide Vit.	20-F	20-G	
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.		163-9	163-10
Forgings	Aluminum oxide Vit.	20D2-G	20D1-G	24-G
Frogs & Switches (Manganese)	Aluminum oxide Vit.	12S-F	16S-G	16S-H
Housings (Auto Axle)	Aluminum oxide Vit.	141D2-G	141D1-G	16-G
Malleable Iron (Annealed)				
(Low Speed)	Aluminum oxide Vit.	141D2-G	161D1-G	20-F
	Aluminum oxide Vit.	20-F	20-G	20-H
(High Speed)	Aluminum oxide Res.	143-8	143-9	163-10
	Aluminum oxide Rub.	143-7	143-8	163-9
Malleable Iron (Unannealed)	Aluminum oxide Vit.	141D2-G	161D1-G	20-F
	Aluminum oxide Vit.	20-F	20D2-G.	20D2-H
	Silicon carbide Vit.	16G+	20-G+	20-H
Monel Metal	Aluminum oxide Vit.	20-G		
Sad Irons	Silicon carbide Vit.	12-H	16-G+	
	Silicon carbide Vit.		16-M	20-H
Safes	Aluminum Oxide Vit.	14-G	14-H	
	Aluminum oxide Vit.		16-G	16-H
Steel Castings (Low Carbon)				
(Swing Frame)				
Operating Speed				
5500 to 6000 s.f.p.m.	Aluminum oxide Vit.	121D2-G	121D1-G	121-G
	Aluminum oxide Vit.	141D2-G	141D1-G	141-G
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.	143-8	143-9	143-10
(Floor Stand)				
Operating Speed				
5500 to 6000 s.f.p.m.	Aluminum oxide Vit.	121D2-G	121D1-G	121-G
	Aluminum oxide Vit.	121D1-G	141D1-G	141-G
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.	143-8	143-9	143-10
(Small Bench Stand)				
Operating Speed				
5500 to 6500 s.f.p.m.	Aluminum oxide Vit.	16D1-G	16-G	16-H
	Aluminum oxide Vit.	20-G	20-G	20-H
(Portable Machines)				
Operating Speed				
5500 to 6000 s.f.p.m.	Aluminum oxide Vit.	20D1G	24D1-H	30D1-H
	Aluminum oxide Vit.	24-G	24-H	
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.	163-8	163-9	163-10
Steel Castings (Manganese)				
(Swing Frame)				
Operating Speed				
5500 to 6000 s.f.p.m.	Aluminum oxide Vit.	14S-G	14S-H	
	Aluminum oxide Vit.	16S-F	16S-G	
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.	143-8	143-9	143-10
(Floor Stand)				
Operating Speed				
5500 to 6000 s.f.p.m.	Aluminum oxide Vit.	14S-G	14S-H	
	Aluminum oxide Vit.	16S-F	16S-G	
Operating Speed				
8500 to 9500 s.f.p.m.	Aluminum oxide Res.	143-8	143-9	143-10
Stove Parts (Cast Iron)	Silicon carbide Vit.	20-G+	24-G+	30-G+
Wrenches	Aluminum oxide Vit.	20-G	20H	24-H
Wrought Iron	Aluminum oxide Vit.	20-G	20-H	24-H

Abbreviations used: Vit. refers to vitrified; Res. to resinoid; Shel. to shellac; Rub. to rubber, and s.f.p.m. to surface feet per minute.

Brass and Bronze Castings Conservation Chart Revised

A NEW edition of the Conservation Chart for Brass and Bronze Castings, reproduced below, was issued recently by the Conservation Division of the War Production Board. It has been prepared to guide engineers and designers in specifying less critical grades of material, and replaces the Down-Grading Chart issued by the division last January. Use of the new substitution chart for conservation in brass and bronze castings by specifications change is explaned by Carter S. Cole, Chief of the Metals Branch of the Conservation Division, as follows:

"Real conservation, where copper alloys are necessary because of engineering requirements, can be effected by specification changes based on a critical examination of end use. The primary objective of this work is a better utilization of available material for maximum efficiency in the war effort. Such changes are the designing engineer's responsibility. The accompanying chart can serve as his guide and the table below it gives a ready cross-reference to the applicable approximately equivalent specifications.

"Designing engineers have utilized the previous chart in making specification changes that have made efficient use of our supplies of secondary and scrap material. In nine months, during which (*Please turn to page* 193)

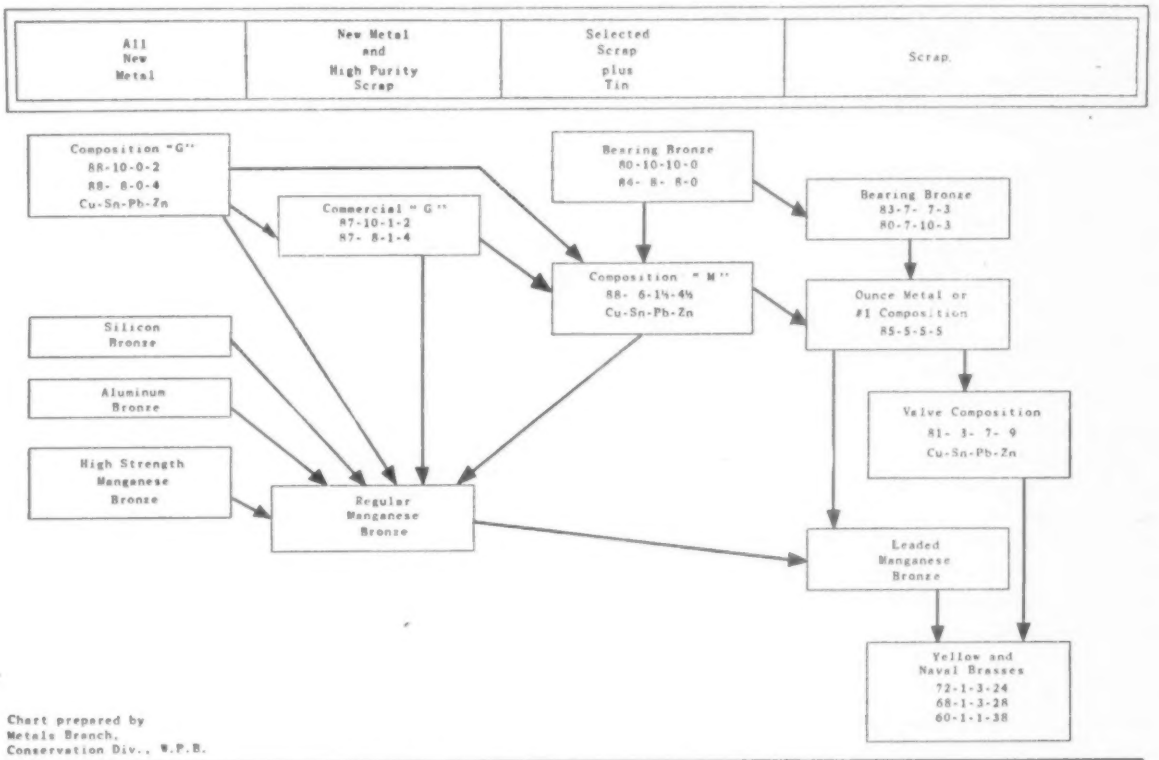


Chart prepared by
Metals Branch,
Conservation Div., W.P.B.

SPECIFICATIONS					
ALLOY	ASTM	ARMY & FEDERAL	NAVY	AMS	SAE
Composition "G"	B 143, 1A & 1B B 60	QQ-B-691a - 5	46M 6(INT) "G"	4845A	62
Commercial "G"	B 143, 2B & 2C	QQ-B-691a - 6	46B 5i "P-c"		
Composition "M"	B 143, 2A B 61	QQ-B-691a - 1	46B 8g "M"		
85-5-5-5	B 145, 4A B 62	QQ-B-691a - 2	46B23c "Oz-c"		40
81-3-7-9	B 145, 5A	QQ-B-691a -11	46B24d		
80-10-10	B 144, 3A			4842	64
84- 8- 8	E-B 144, 3Y	QQ-B-691a - 8	46B22(INT) "II"		
83- 7- 7-3	B 144, 3B	QQ-B-691a -12			660
80- 7-10-3	E-B 144, 3X				
Naval Brass	B 146, 6C	QQ-B-621 - A	46B10(INT) "N-c"		
72- 1- 3-24	B 146, 6A	QQ-B-621 - C	46B11(INT)		
68- 1- 3-28	B 146, 6B	QQ-B-621 - B	46B11(INT)		41
Silicon Bronze		QQ-C-593	46B28(INT)		
Aluminum Bronze	B 148, 9A & 9B	QQ-B-671a	46B18c		68
H. S. Manganese	B 147, 8B & 8C	QQ-B-726b B & C	46B29(INT) "MA-C"	4862	
Regular Manganese	B 147, 8A	QQ-B-726b - A	49B 3e "Mn-c"	4860	43
Leaded Manganese	B 147, 7A	QQ-B-726b - D			

NOTE: Specifications, as shown, are approximately equivalent but may not in all cases be interchangeable for procurement and inspection.

September 11, 1943.

Study MALLEABLE CASTINGS Properties for Military Applications

By O. W. SIMMONS and P. C. ROSENTHAL
Research Engineers
and
C. H. LORIG
Official Investigator
Battelle Memorial Institute, Columbus, O.

Editors' Note: This is the second of a series of three articles from a report which is a final presentation covering an investigation conducted by the War Metallurgy Committee with the support of the Office of Scientific Research and Development at the request of the Office of Chief of Ordnance. Due to space limitations it was necessary to condense the report by eliminating many tables and curves. However, sufficient data have been included to illustrate and amplify the discussion

LOW temperature properties of irons *A* and *B*, before and after "Flecto" heat treatments, are illustrated in Fig. 4. (Editor's Note: Similar curves were developed for short cycle malleables *C* and *D* and for cupola malleable *G* but are not included due to space limitations.) The low temperature data for all irons as received, including the pearlitic malleable iron *P*, *E*, *F*, and *H*, are plotted in Fig. 5.

While every attempt has been made to make the curves fit the data as closely as possible, it should be recognized that in cases where considerable scatter in results was obtained, the curves may not represent the trend lines that would result from a larger number of tests. A too literal interpretation of the curves therefore should be avoided.

Referring to the curves for the standard malleables in Fig. 4, it is seen that at temperatures below room temperature there is a decided dropping off in the resistance to transverse impact of all the irons tested. However, in all cases the double-width notched Charpy specimen gives approximately twice the value of the single-width specimen except in the case of the standard malleable *B*. For this iron the double width value in the "as received" condition drops abruptly to about equal the value of the single-width specimen when the temperature drops from —40 to —50 degrees Fahr. No other irons of this group exhibited this obvious manifestation of notch sensitivity at low testing temperatures, although the increasingly crystalline appearance of the impact bar fractures as the test temperature was lowered indicated a trend toward embrittlement in all the irons.

These trends are not peculiar to malleable irons. Cast steels, for instance, will give the same types of curves, except that the relative impact values will be higher. The Charpy values for steel will decrease in a gradual manner down to a relatively low temperature, say —80 degrees Fahr. or will drop off suddenly at some higher temperature, as did iron *B*, depending upon such factors as the degree of deoxidation of the melt prior to pouring the castings. Complete deoxidation with aluminum generally leads to a gradual trend while the abrupt decline often follows a partial deoxidation. ("Comparative Quality of Converter Cast Steel" by C. E. Sims and F. B. Dahle, *Proceedings*, American Society for Testing Materials, Vol. 42, 1942)

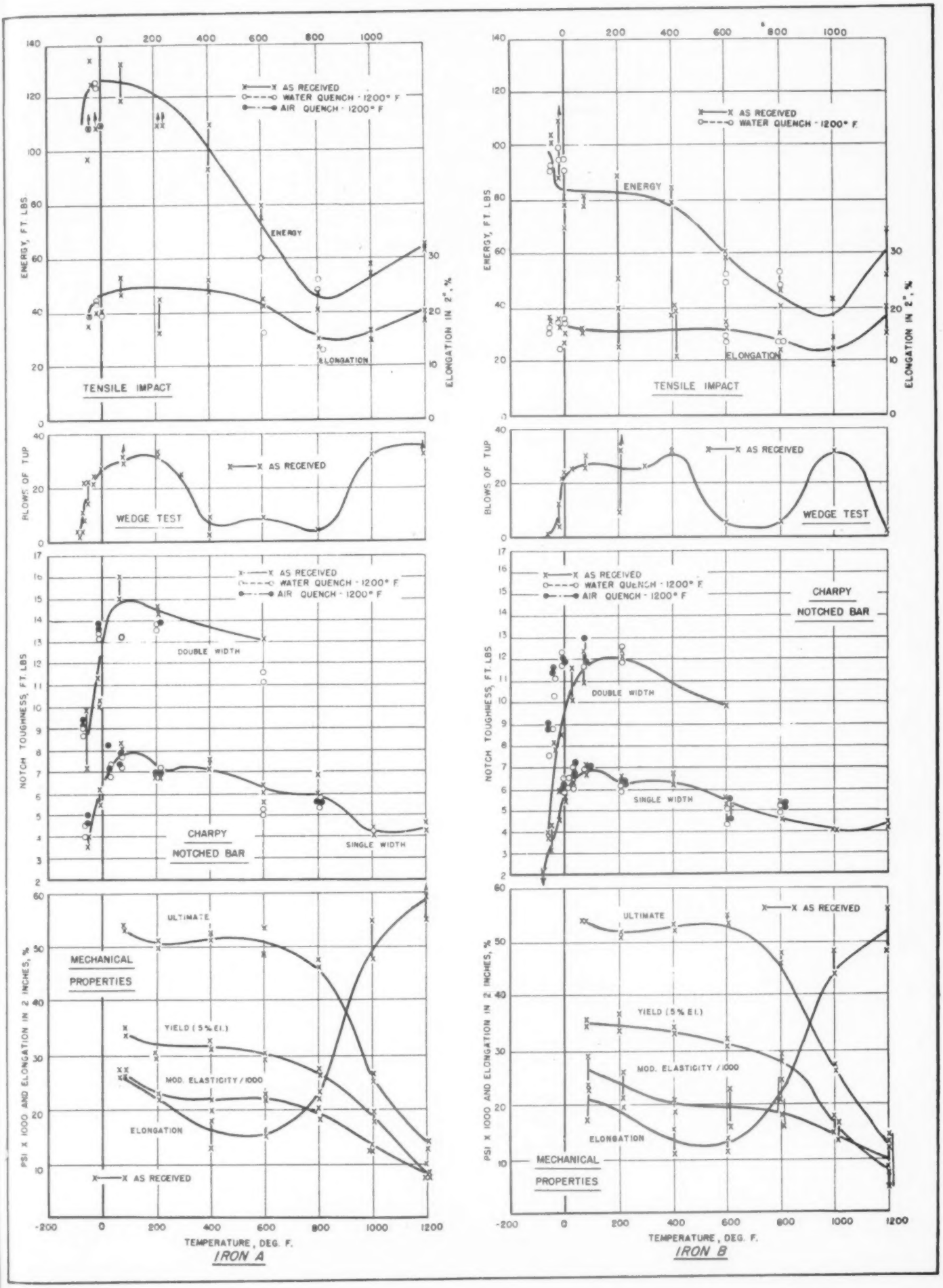
Except for cupola iron *G*, the malleables had good resistance to impact in the unnotched bar tests and were relatively insensitive to low temperature effects. Despite the fact that the unnotched bar values held up at low temperatures, the appearance of the fracture surfaces in this type of specimen showed that the ductility of the material was lowered. This was revealed by the increase in the area of the steely crystalline fracture.

The wedge test subjects the metal to a complicated combination of stresses which are difficult to analyze. Material on the outside of the curl is stressed in tension while the inside surface is under compression. As the modulus of elasticity of the material changes with temperature the amount of energy that is absorbed elastically will vary. The energy beyond this value then is absorbed by the deformation of the specimen. As each succeeding blow is delivered it will be directed against new portions of the specimen and the deformation experienced will tend to work harden the portions thus exposed.

Eventually the work hardening becomes sufficient so that upon the delivery of a new blow of the tup, the previously deformed material is stretched beyond its ability to remain intact and fracture results. The anvil of the machine is so designed that the wedge is curled tightly as the test progresses, until at about 15 to 20 blows of the tup the specimen contacts a curved portion of the anvil which tends to uncurl the wedge under subsequent blows. This further extends the material, which is already work hardened, with the result that rupture takes place on the underside of the curl in these specimens.

The wedge test revealed that there was a marked dif-

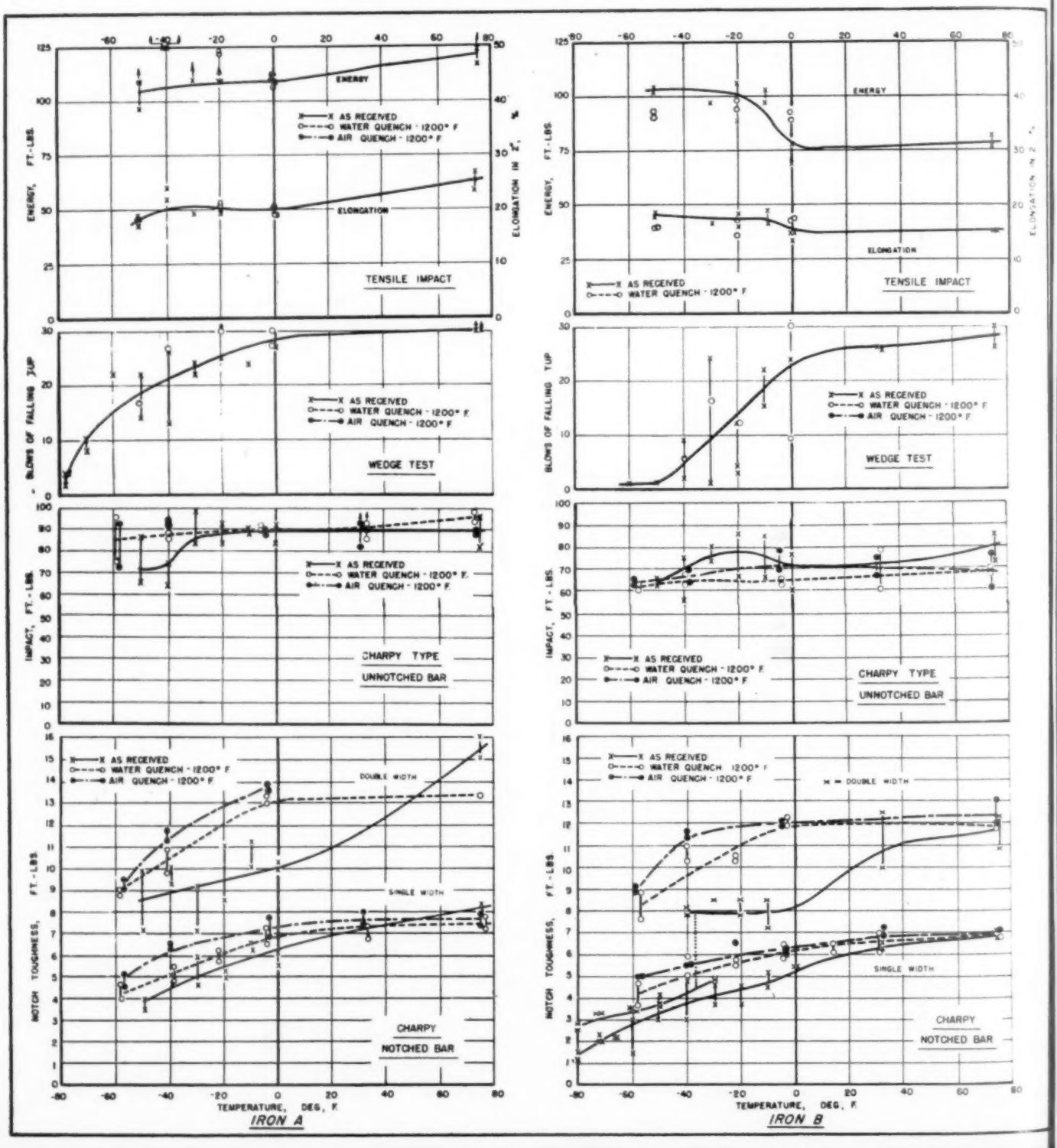
Fig. 3—High temperature properties of malleable irons A and B


X AS RECEIVED
WATER QUENCH - 1200° F
AIR QUENCH - 1200° F
ENERGY, FT. LBS.
ELONGATION IN 2", %
ENERGY
ELONGATION
TENSILE IMPACT
BLOWS OF TUP
WEDGE TEST
NOTCH TOUGHNESS, FT. LBS.
DOUBLE WIDTH
SINGLE WIDTH
CHARPY
NOTCHED BAR
PSI X 1000 AND ELONGATION IN 2 INCHES, %
ULTIMATE
YIELD (5% EL)
MOD. ELASTICITY / 1000
MECHANICAL
PROPERTIES
TEMPERATURE, DEG. F.
IRON A
IRON B

ference in resistance to repeated impact among the five lots of malleable iron tested, a difference not always revealed by the single blow impact tests. For instance, standard malleable, *A*, stood up well at temperatures as low as —60 degrees Fahr., but standard malleable, *B*, showed a loss in resistance at —20 degrees Fahr., while *G* broke with the first blow at all test temperatures. Wedge test results for iron *C* were too erratic to be plotted, both high and low values being obtained at the same test temperature. Microscopical examination of some of the test bars was not successful in accounting for this peculiar behavior. Wedge bars from iron *D* gave uniformly low test values. The presence of pearlite remnants undoubtedly was responsible for the poor resistance of this iron to repeated impact, since an additional second stage anneal, consisting of 20 hours at 1300 degrees Fahr., followed by cooling to 1140 degrees Fahr. in 2.3 hours and then air cooling, decidedly improved the wedge test values. This is illustrated in Fig. 5 where the curves for the reannealed bars are labelled "*DD*". Unnotched Charpy bar values also were increased noticeably by the heat treatment, and a slight gain in notched Charpy bar values at the lower temperatures was achieved.

Initially the thin section of the tip of the wedge absorbs the energy and since this portion in the standard malleables is likely to be nearly wholly decarburized to ferrite or pearlite it is evident that the tip will be particu-

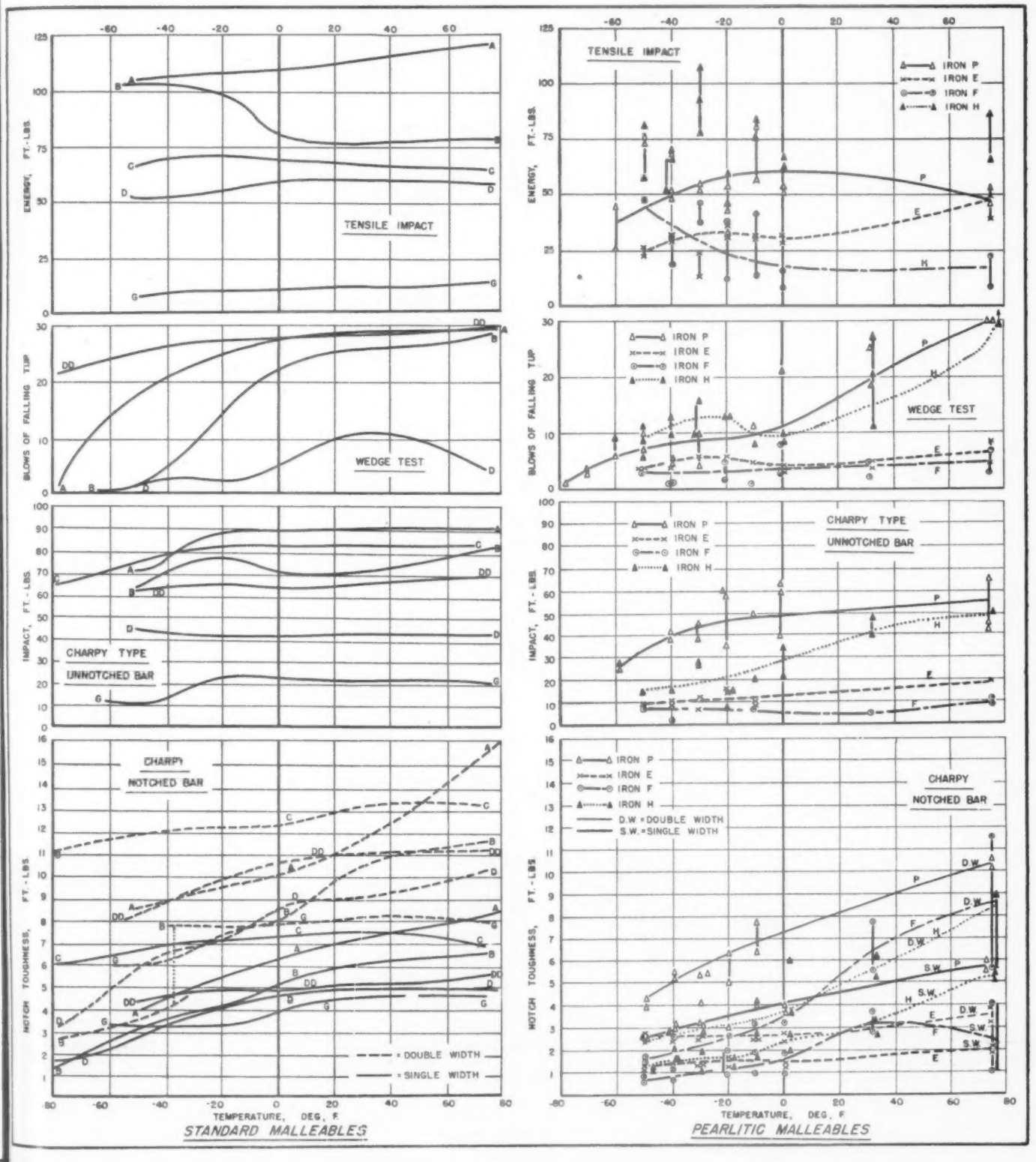
Fig. 4—Low temperature properties of malleable irons A and B



larly sensitive to changes in the energy absorption ability of the iron. This does not seem to be the factor contributing to the poor wedge results with iron *G*, however, since successive blows on the same wedge were found to break off a new piece of the wedge each time.

The tensile impact test gave erratic results in several cases, particularly in the short cycle malleables *C* and *D* and to a lesser degree in iron *B*. It may be that since the section of the tensile impact specimen was only one-twentieth of a square inch in area, which in relation to the size of the inclusions was relatively small, certain concentrations of graphite or inclusions might lead to unusually high or low values depending upon whether they were machined out or left in the test section. The fact that the metal under stress was distributed over considerable length rather than being concentrated at a point rendered the stress concentrations to be relatively mild so that the results for all irons were relatively insensitive to the effects of temperature. Iron *B* increased in resistance with lowered test temperatures. This unusual behavior was not found in any of the other standard malleables, and therefore, may perhaps be a function of the test conditions, such as the test bar size, (*Please turn to page* 190)

Fig. 5—Low temperature properties of all malleable irons as received



LADLE INOCULATION

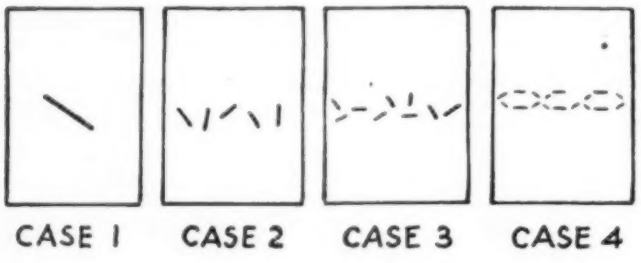
Improves Gray Iron Properties and Structure

GENERAL effects of ladle inoculation have been known for some time. In attempting to improve the quality and control of high strength gray cast iron in a large commercial foundry, it was believed that possibly ladle inoculation would prove advantageous. It was further believed that by means of ladle inoculation a simplified cupola practice could be developed.

In a jobbing foundry dealing with a wide range of section sizes and varying customers' specifications, it is quite common to adopt several different high test iron analyses; say iron No. 1 for sections of ½ inch to 2 inches, iron No. 2 for sections of 2 inches to 5 inches, and iron No. 3 for sections above 5 inches.

It was the belief in beginning this program that possibly a "leveling" of foundry properties could be obtained by the use of silicon ladle additions; in other words, that the section sensitivity could be so reduced that one metal could be developed to satisfy the majority of section requirements, being neither too hard or showing too much chill for the light sections, nor being too soft or open for the heavy sections.

Furthermore, if several irons of different tensile strength specifications are to be replaced with one new iron, then this new iron must be able to meet the specifications for the strongest iron that it is to replace. It is to be noted here that, except with certain special specifications, cast iron generally is specified according to tensile strength in an arbitration bar, in accordance with A.S.T.M. recommendations.[1] Chemical analyses should be used as a



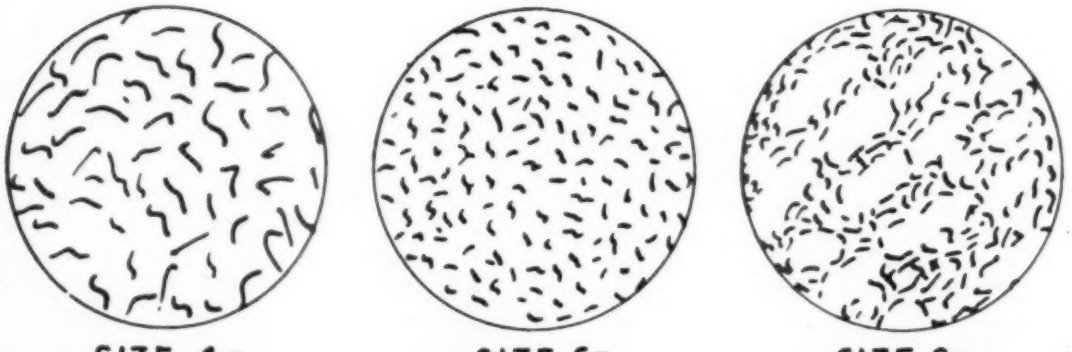
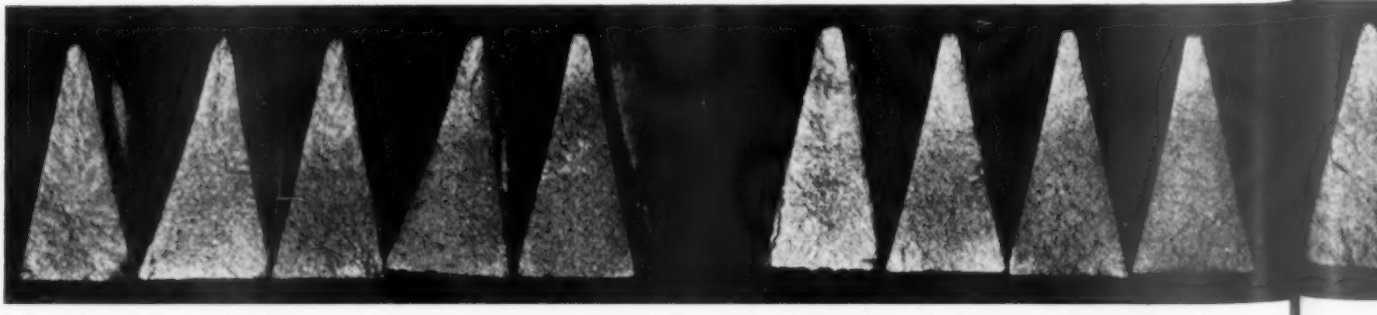


Fig. 1 — (upper left) Effect of graphite distribution

Fig. 2 — (left) Graphite fluke size and distribution



By HAROLD W. LOWNIE JR.
Metallurgical Engineer
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

method of *control* rather than as a specification.[2]

Test bar properties are the usual indexes of metal strength and are so used in this study. However, from the practical viewpoint these properties are of little value if the metal shows undesirable foundry characteristics. For this reason, foundry properties have been kept constantly in mind and referred to frequently. This viewpoint was aided considerably by the fact that all of the tests were performed in a large foundry under regular production conditions instead of in a laboratory.

It is the further specific purpose of this paper to determine the *amount* of ladle inoculation necessary to obtain optimum physical properties. Although the literature contains considerable information on the theory and effects of ladle inoculation, little information is given on the amount of addition to be made.

(a) *Raw Materials.* The efficient melting of high quality gray cast iron requires the engineering control of numerous variables. The raw materials; coke, scrap, pig iron, limestone, and air; must be watched carefully as to both quality and quantity. Charging, melting, and tapping techniques must be developed so as to yield a uniform, high quality product.

Uniformity can be obtained only by rigid control of many variables. Raw materials should be of known composition and of controlled size. Coke requires special attention to composition, size, and physical strength. Uniformity of product does not require uniformity of raw materials, but at least knowledge of the variations so that corrections may be applied.

In the discussion of raw material control, air should not be neglected. The temperature and the moisture content of the air affect the amount of oxygen supplied for combustion.

Once supplied with raw materials of known properties, these materials must be proportioned carefully so as to yield a melt of the desired properties, accurately measured, and finally charged into the cupola.

(b) *Procedures and Techniques.* Operation of the melting process requires good "burning-in" practice and the establishment and maintenance of a suitable coke bed. Tuyeres, slag hole, tap hole, cupola lining, and cupola bottom must be maintained (*Please turn to page* 198)

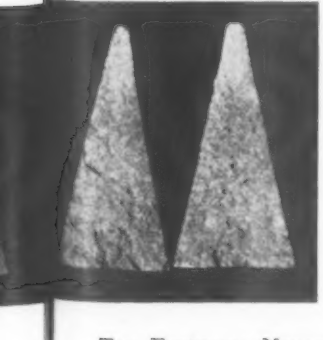


Fig. 3—Effect of inoculation on chill depth. Left to right base iron series D; with 0.3 per cent SiMnZr added; 0.6 per cent SiMnZr added; 0.9 per cent SiMnZr added; 1.2 per cent SiMnZr added; 0.25 per cent FeSi added; 0.50 per cent FeSi added; 0.75 per cent FeSi added; 1.00 per cent FeSi added; pump—0.5 per cent SiMnZr added; pipe—0.5 per cent FeSi added

Fig. 4—Inoculated iron ½-inch section. Tensile strength 46,750 pounds per square inch, brinell hardness 269, combined carbon 0.76 per cent, containing 70 per cent 6-7E flakes and 30 per cent 8D flakes. Requires 1000X to resolve pearlite, small amounts of ferrite, steadite and sulphides. See reference 4 in bibliography

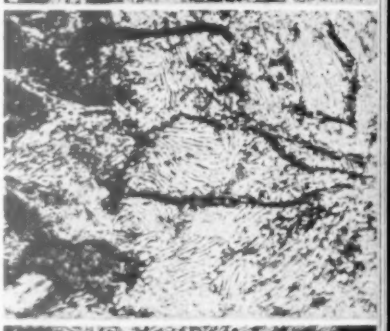


Fig. 5—Inoculated iron ⅞-inch section. Tensile strength 44,450 pounds per square inch, brinell 255, 0.73 per cent combined carbon with 60 per cent 5-6A flakes, 5 per cent 8D, and 35 per cent 6E flakes. 1000X. Same as ½-inch except pearlite is coarser

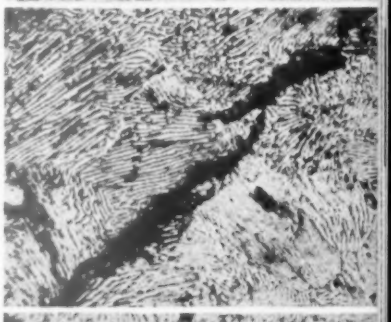


Fig. 6—Inoculated iron 1.2-inch section. Tensile strength 41,560 pounds per square inch, 235 brinell hardness, 0.68 per cent combined carbon with 80 per cent 5A, 5 per cent 4A, 14 per cent 5E, and 1 per cent 8D flakes. 1000X. Pearlite coarser than ⅞-inch section

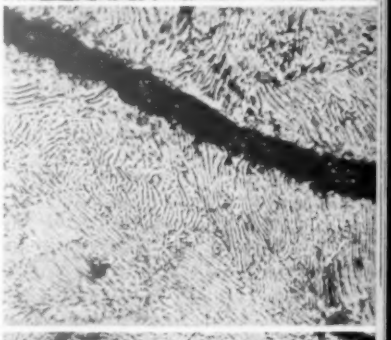


Fig. 7—Inoculated iron 2-inch section. Tensile strength 33,300 pounds per square inch, 212 brinell hardness, 0.61 per cent combined carbon with 100 per cent 4A flakes. Pearlite coarser than in 1.2-inch section. 750X

Fig. 8—Inoculated iron 3½-inch section. Tensile strength 29,800 pounds per square inch, 197 brinell hardness, 0.59 per cent combined carbon with 55 per cent 3A, 35 per cent 4A, and 10 per cent 5-6A. 1000X. Similar to 2-inch section

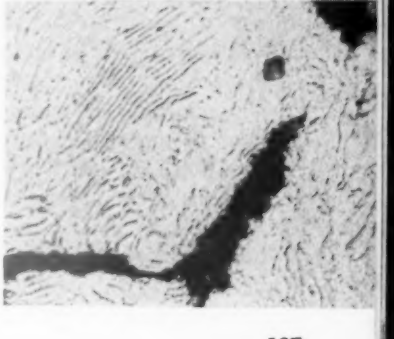


Fig. 9—Inoculated iron 6-inch section. Tensile strength 27,400 pounds per square inch 187 brinell hardness, 0.55 per cent combined carbon with 100 per cent 3-4A flakes. 1000X. Pearlite coarser than in 3½-inch section, otherwise similar

Suggests Mixture Needed for Suitable Sand Match

Q.—We shall appreciate your advice on how to make a sand match. We have tried old core sand bonded with linseed oil, but the result is not satisfactory.

A.—Where a substantial follow board or sand match is required, one that will stand up in repeated use over a comparatively long period, the sand is mixed with linseed oil and a small amount of litharge, say a small handful to a shovelful of sand. The sand is dried and then mixed with linseed oil or other core oil in the proportion of 1 part oil to 25 parts sand. Sufficient water is added to render the mass workable. Some foundrymen add varying amounts of spent sandblast sand, or dust from the tumbling barrels to the new molding sand. This type of sand match will dry hard in about 24 hours when it may be given a light finishing touch with a coat of shellac.

Manganese Bronze Pulleys Show Corrugations on Surface

Q.—At the present time we are making manganese bronze pulleys and are having considerable trouble with an insert in the casting. Casting is 11 inches outside diameter, 3¾-inch face with an insert on both sides between the hub and outside face. This leaves the insert 1 inch thick. We make the casting with a large riser on the hub and four risers off the face. Mold is dry sand. Metal seems to be corrugated in corner of insert and face, and is poured around 1850 degrees Fahr.

A.—The problem of making a manganese bronze casting such as you describe should be simple. We assume that you are casting them horizontal or on the flat. We are not clear on what is meant by insert. Do you mean that you insert a 1-inch thick steel web to connect the hub with the periphery of the pulley, or do you mean that the insert is the web of the casting which is poured at the same time as the rest of the casting?

From your description of the location of the corrugated surface we assume that the web connection between hub and periphery is cast at the same time as the rest of the casting. Due to the fact that the mold fills up all around from the bottom, and finally spreads over the flat web, it tends to flow from all sides toward a central point. Consequently wherever a junction of the different streams occurs, the corrugated apearance develops.

Consequently, if you cast the pulleys so that the web is not exactly level or horizontal, the metal would flow from one side of the casting to the other and the stream would unite at the base of the upper half of the cylindrical periphery. Any irregular formation at that point would be washed up with the inflow of the remaining metal, and might logically be expected to wash up into one of the risers; thereby eliminating your trouble if our assumption is correct.

Another way to overcome the difficulty is to pour the castings vertically with a large riser located on the rim over the web at a central point on the pulley. That would complicate cleaning due to the necessity of sawing off the riser to conform to the curved surface. Also trouble might be encountered from trying to feed the hub through the 1-inch web or what you call the insert. The temperature at which you are pouring the castings is somewhat higher than one would anticipate for such a bulky casting. A temperature from 1700 to 1750 degrees should give good results if the gates are designed to permit easy flow of metal into the thick walls.

Be careful to maintain the composition of the manganese bronze accurately to the desired specification since changes in the copper-zinc ratio materially change the pouring temperature not to mention the effect on fluidity of the metal. You should deal with the same identical alloy each time otherwise you will have to change other details of practice to produce a uniformly, satisfactory product.

Desires To Decrease Diameter Of the Bore in Sheave

Q.—One of our ordnance items is a cast iron sheave 12 inches in diameter with a bore of 1⅝-inches and a tolerance of 0.001-inch oversize. We were told that a bored and reamed hole would be satisfactory and as a result the bore in a considerable number was 0.002-inch oversize and the castings were rejected. The customer is willing to accept the castings if we can reduce the size of the hole 0.001-inch. We tried heating them with a coke fire and also with charcoal, but the result was an egg shaped hole. We are faced with the problem of shrinking the hub without affecting the outside diameter of the sheave.

A.—Any one of several methods might be utilized to reclaim the sheave castings, but whether these methods are available, or whether they are cheaper than casting and machining a new lot of wheels, is a point that can be determined only by a person on the premises and familiar with all the factors in the problem. For example the quickest, easiest and probably cheapest method of doing the job is to electroplate the surface of the hole with a deposit of iron one or two thousandths in thickness and

then refinish to the proper size. However, this solution is of no practical interest if you are not familiar with the electroplating process, if you have no facilities for the work, or if you have to pay freight and ship the castings to a distant point where facilities are available. A second solution is to have the shaft maker supply shafts 0.001-inch over size for this particular lot of sheaves. Of course this solution will not be accepted if the shafts are already made or if the wheels are to be shipped to another base for assembly where all parts are interchangeable.

While your experience with heat treating has been discouraging it is possible that the technique and not the principle is at fault. Cast iron grows to some slight extent under repeated heating and cooling. Therefore, a second or even a third treatment might prove satisfactory. The castings should be raised to a bright red heat and then allowed to cool slowly. They should be laid flat and if necessary the rims should be supported to prevent distortion. The outside diameter of the wheel will be increased slightly by the treatment, and if this is a factor of course the heat treatment remedy need not be considered. One part of a casting cannot be expanded independently of the other parts. Another suggested remedy which may or may not be permissible in this particular instance, is to rebore the hubs ¼ or even ½-inch over size and then insert cast iron bushings. This involves a considerable amount of machine work and the possibility exists that the customer might not accept castings treated in this manner. This point should be cleared up in advance. Our private opinion is that the least costly horn of the present dilemma is to scrap the castings and make a new lot.

Desires To Produce Malleable Cast Iron in Cupola

Q.—We operate a foundry in Mexico producing light and heavy castings in gray iron, and require some malleable castings which we had made elsewhere. However, due to war effort in the United States as well as here, we cannot obtain the latter. Therefore, we are considering the advisability of producing our own requirements in malleable, but are confronted with numerous problems, and would like to have some information before going further. We would like to know if the pig iron we have is suitable. We have three brands which average 3.00, 2.50, and 2.00 per cent silicon with an average manganese content of 0.75 per cent; phosphorus content of 0.75 and sulphur content under 0.05 per cent for all three. We intend using a small cupola lined to 21 inches. Can you give us information on the size of the iron charges and their make-up? We do not have any malleable scrap available.

A.—Most of the cupola malleable cast iron made in this country is used for pipe fittings, and its composition will like other casting alloys depend upon the thickness of section involved as well as other factors. In general, the range will be 2.50 to 3.00 per cent total carbon, 0.70 to 1.10 per cent silicon, 0.40 to 0.60 per cent manganese, 0.20 per cent maximum phosphorus, and 0.150 to 0.250 per cent sulphur. The tensile strength ranges from 44,000 to 48,000 pounds per square inch, the yield strength from 31,500 to 35,000 pounds per square inch, and the elongation from 7 to 9.9 per cent in 2 inches.

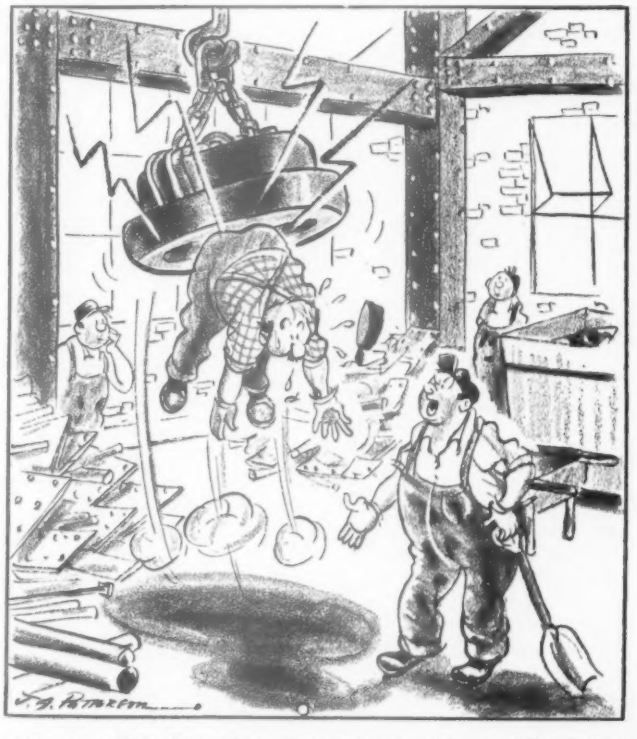
With the limitation of 0.20 per cent maximum on phosphorus content in the finished castings, you will not be able to use much of the pig iron you have available, and the major portion of the charge will have to be steel scrap since you do not have any malleable scrap. A rough calculation indicates that with a charge composed of 20 per cent of the highest silicon pig iron and 80 per cent plain carbon steel scrap, the final analysis would show around 0.70 per cent silicon, 0.44 per cent manganese, and 0.20 per cent phosphorus. Since the phosphorus is practically at the maximum it would be advisable to reduce the pig iron to 15 per cent and increase the steel to 85 per cent, giving an approximate analysis of say 0.54 per cent silicon, 0.41 per cent manganese, and 0.16 per cent phosphorus. Since the silicon and manganese contents are lower than desirable, additions of ferrosilicon and ferromanganese will have to be made.

With your small cupola we believe that it is advisable to use small charges to obtain a more uniform composition in the final iron. Also the pig, steel scrap, and coke be small to obtain better melting efficiency. Our suggestion would be 20 or 25-pound coke splits with 130 or 165-pound iron charges, but those may be changed to suit your experience with small cupola operation. The essential point is to secure hot, fluid iron. You may have to do some experimental work to attain the proper conditions, but there is no reason why you cannot produce malleable cast iron from the cupola.

You undoubtedly are familiar with the fact that the low silicon iron from the cupola must be handled rapidly into the mold as its freezing point is high. Also as cast the fracture is white, and the castings must undergo heat treatment at temperatures around 1550 to 1650 degrees Fahr. for a considerable period of time with slow cooling to obtain a commercially acceptable product.

GANGWAY!

By J. A. Patterson



"There! what'd I tell ya' about foolin' around here with all that junk you carry in your pockets."

Uses Plaster Molds For Pattern Making

Q.—We are interested in obtaining information on the plaster molding process for making aluminum alloy patterns, and will appreciate any help you can give.

A.—Plaster molding is being practiced by an increasing number of foundries for production of aluminum alloy and copper-base alloy castings. Several grades of plaster are available for making molds, and in your case where accuracy and finish are paramount the proper grade of plaster should be secured. As a general rule the plaster seldom is used alone, being mixed with a variety of materials to provide structural firmness and strength, give it a more open structure so that it will dry easier, etc. Those materials include wood flour, silica, asbestos fiber, fireclay, fibrous talc, etc. One mixture which is said to be suitable is composed of 4 parts plaster, 1 part fibrous talc, and 5 to 8 parts water.

The pattern must be oiled, greased or sprayed with some type of parting material so that after it is covered with plaster, and the latter has set, the pattern may be removed without damaging the plaster surface. While the plaster mold appears dry after it has air-set, it is far from being suitable for the reception of molten metal, and should be dried thoroughly so that practically all of the moisture is driven off. That will require a temperature around a red heat. Then the mold is allowed to cool down to handling temperature. Molds should not be permitted to stand around until they are cold since they tend to absorb moisture. Hence, it is advisable to pour them while still warm.

Gates into the castings should be kept as small as possible, and to provide a good pressure head, a sleeve is placed over the pouring sprue to extend its height. Preferably the molten metal should enter at the lowest point of the casting cavity and fill it without any turbulence. For more detailed information on plaster molding it is suggested that you get in touch with firms supplying plaster whose names may be found in the advertising pages of THE FOUNDRY.

Plaster Employed For Followboard

Q.—We shall appreciate information on the methods employed in making plaster matchplates or followboards.

A.—Under certain conditions where the service is not severe, plaster of paris makes a satisfactory match or followboard. That is a device to support patterns with irregular parting lines in the drag part of the mold, and to present a ready made joint surface when the drag is rolled over. To make a followboard, the pattern or patterns is or are rolled over or bedded in a drag filled with sand. An accurate parting line and surrounding surface are prepared with the tools in the usual manner. A suitable frame, wood or metal is placed in the drag and filled with liquid plaster. In some instances a bottom board is screwed to the frame after the plaster has solidified. At other times the board is nailed or screwed on before the frame is placed on the drag.

In this second instance the liquid plaster is poured through a hole in the board just as one might pour metal into a sand mold. For small plain jobs no reinforcement is necessary. On large or intricate followboards it is advisable to incorporate wood blocks, nails, rods or pieces of pipe at strategic points. These may be located in advance or placed in the plaster mass while it is still in a liquid or semi-liquid condition. A row of projecting nails will anchor the plaster firmly in the frame. Several proprietary materials also are available. On account of their great strength, smoothness and freedom from shrinkage they find extensive application as followboards, matchplates, patterns and master corebboxes.

Condenser Castings Show Leakage

Q.—We are making condenser header castings weighing up to 1200 pounds with sections varying from 1⅜ inches down to ½-inch. They must withstand a water test of 250 pounds per square inch, and the iron must have a tensile strength of 35,000 pounds per square inch. We have been using 30 to 35 per cent structural plate scrap about ¼-inch thick and 65 to 70 per cent motor block cast scrap with additions to the ladle to bring the copper to 0.5 per cent and the chromium to 0.15 per cent. We also add a proprietary alloy containing silicon-manganese and zirconium to the ladle in the amount of ⅜ to ½-pound per 100 pounds of metal. We add 2¾ pounds of ferromanganese to 1000 pounds of iron in the cupola. We have had high losses of the castings due to the castings being too hard to machine, or to leakage, and to both. Just now motor block scrap is not available, and other cast scrap does not seem to work. We are trying to get an allocation of pig iron.

A.—Assuming that the structural scrap to be plain carbon steel containing say 0.25 per cent silicon, 0.50 per cent manganese, and 0.05 per cent phosphorus, and that the motor block scrap averages 2.20 per cent silicon, 0.60 per cent manganese, 0.30 per cent phosphorus, 0.50 per cent nickel and 0.25 per cent chromium the final iron from the cupola with 30 per cent steel and 70 per cent motor blocks will show about 1.75 per cent silicon, 0.63 per cent manganese, 0.23 per cent phosphorus, 0.35 per cent nickel, 0.5 per cent copper, and 0.33 per cent chromium. Using 35 per cent steel and 65 per cent motor blocks the final analysis will show approximately 1.66 per cent silicon, 0.63 per cent manganese, 0.21 per cent phosphorus, 0.33 per cent nickel, 0.5 per cent copper, and 0.31 per cent chromium.

The only fly in the ointment with those calculations is that the motor blocks are assumed to be of uniform composition, but your statement that one time you have castings too hard to machine and the next time they leak under pressure, indicates that such is not the case. Our suggestion would be to have some analyses made of the various castings, and determine the compositions—comparing those with which you have trouble, and those which are satisfactory. You do not mention the basis on which you determine the amount of the silicon-manganese-zirconium alloy to be added to the ladle, and there is a possibility that the lesser quantity is added to the charge low in silicon and perhaps high in chromium. Under such conditions the iron would tend to be hard while under the reverse condition where the larger amount of alloy is added to iron high in silicon and low in chromium, the iron would tend to be soft.

Hence, you can realize the necessity for maintaining a uniform composition of melted metal to obtain the greatest benefit of any alloy addition. While it is possible to produce satisfactory castings with all scrap mixtures, it generally requires technical control and experience to obtain consistent results. As you indicate, you undoubtedly will have much better success with some pig iron in the mixture although we do not believe, in view of the shortage of pig iron, that it is advisable to go as far as you intimate —the use of all pig with some structural scrap.

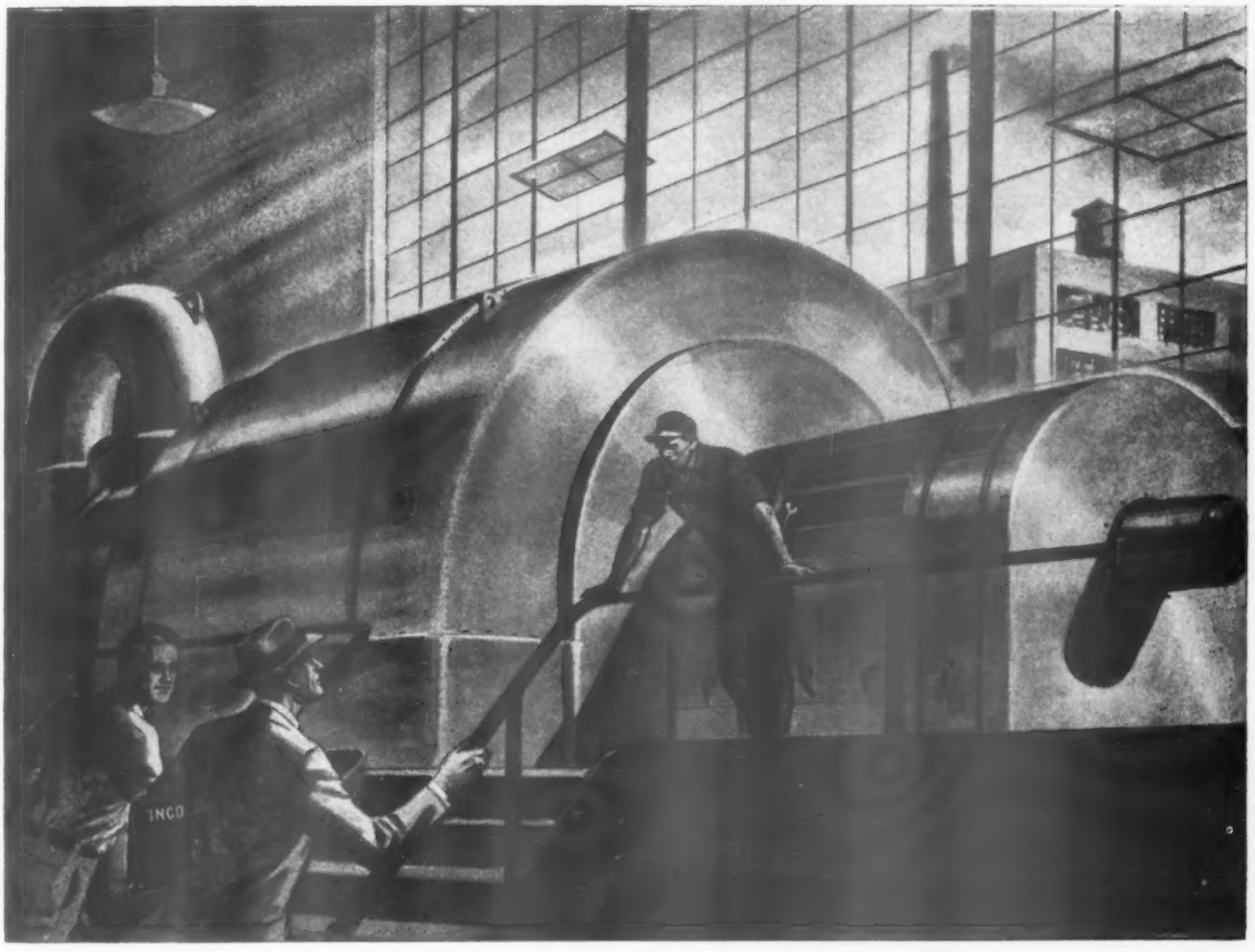
The data you give on your charges indicate that under your foundry conditions an iron containing from 1.65 to 1.75 per cent silicon, 0.60 to 0.70 per cent manganese, 0.5 per cent copper and 0.15 per cent chromium would serve for the condenser header castings. Hence, we suggest an iron charge composed of 30 per cent structural steel scrap, 20 per cent pig iron averaging 2.25 per cent silicon, 50 per cent cast machinery scrap, with 3 pounds ferromanganese, and 5 pounds silicon-manganese-zirconium per 1000 pounds of metal. Copper and ferrochromium will have to be added to bring those elements to the desired point. That mixture is only a tentative suggestion, and may have to be altered to give the desired results in the casting.

Bronze Valve Bodies Leak at Bottom

Q.—We are having considerable leakers in 2-inch admiralty bronze valve bodies when tested to 500 pounds per square inch pressure. We have tried different methods of gating and various pouring temperatures. Leaks generally are on the bottom half of the casting. We sawed some of the leakers through the porous section, and the trouble appears to be lack of metal during cooling. Can you give us information on pouring temperature, method of gating, number of risers, etc.?

A.—You are correct in your surmise that the leakers are due to lack of feed in the heavy sections resulting in microscopical passages through the metal. Cure is to provide risers at locations which will feed those sections properly. Location of gates and risers should be

(*Concluded on page* 132)



NICKEL AIDS THE POWER INDUSTRY

to KEEP 'EM OPERATING!

In this day of acute shortages of almost everything, power plant engineers are doing an amazing job of meeting demands for power—the power to keep 'em operating.

Part of this success is due to their foresight in specifying materials that assure long life and withstand the added hardships imposed by ever-increasing peak-load demands.

With the production of tanks, guns, and planes dependent upon power capacity, Nickel makes a valuable contribution towards uninterrupted operation, through the improved properties it imparts to ferrous and non-ferrous alloys used in power plant equipment.

So today the exigencies of war illustrate more clearly than ever the simple truth of the familiar axiom, "A little Nickel goes a long way" toward increasing the dependability of power plant equipment, from turbine blades to high pressure valves, from flange bolts to shaft forgings.

The technical staff of International Nickel has been privileged to cooperate with the power plant engineers and Government authorities who have made possible the great increases in power on which so much of the war effort depends. INCO engineers and metallurgists offer counsel and data to all who desire assistance in the selection, fabrication, and heat treatment of ferrous and non-ferrous metals.

New Catalog Index

New Catalog C makes it easy for you to get Nickel literature. It gives you capsule synopses of booklets and bulletins on a wide variety of subjects—from industrial applications to metallurgical data and working instructions. Why not send for your copy of Catalog C today?

* *Nickel* *

THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall St., New York 5, N. Y.*

(*Concluded from page* 130)
planned so that the flow of metal does not create turbulence where the streams meet. Long and irregular gating should be avoided since the longer the metal flow, the greater the loss of temperature. Pouring temperature of the composition you mention is from 1950 to 2150 degrees Fahr., but sometimes it may be necessary to use higher temperature. However, hold it as low as possible to obtain sound castings and good physical properties.

You mention that you sawed through the porous section, but we believe that you will be able to get a better picture of the trouble if you will fracture the casting at various points. That will show discolorations or open structure which will indicate definitely what must be done as you experiment with different gating and risering methods. We cannot give any definite information on the number of gates and risers to be used since we are not familiar with your present practice. Making one casting in a mold differs considerably from making two or more in the mold. Also practice used successfully in some foundries might not work under your conditions. It would appear that your present practice is not so far wrong. Try making slight changes in gating and risering—with fracturing to see if you cannot remedy the situation.

We note that you say that the leakage occurs mainly at the bottom of the casting indicating that you gate at a point which floats the colder metal to the top of the mold and fills the bottom with hot metal. However, the metal in the riser does not feed back, probably due to the fact that it is cold. Hence, it might be advisable to place the riser close to the gate so that it would be full of hot metal also. Possibly, if the examination of the fracture shows no discoloration but just fine microscopical porosity, an annealing might overcome the leakage through a change in structure of the alloy. You might try heating the castings in an oven or furnace to around 1400 degrees for 3 to 4 hours, and then cooling slowly in the furnace.

To Melt Gray Iron In a Crucible

Q.—We shall appreciate your opinion on whether it is possible to melt ordinary cast iron in a crucible in a pit type coke fired natural draft furnace.

A.—A prominent crucible manufacturer claims that the melting of gray iron in a graphite crucible is so simple that it is surprising the practice is not more general. The iron is broken to approximately walnut size and packed in the pot with alternate layers of charcoal. For example a No. 80 crucible could be charged with three 3½-inch layers of iron and three 1-inch layers of charcoal. This would yield about 100 pounds of molten iron. The amount might be increased to some extent by adding more iron as the charge sank in the pot. It is advisable to keep the pot covered with the bottom of a discarded crucible. Gray iron melts at a temperature of approximately 2300 degrees Fahr., considerably higher than that of brass, but with the layers of charcoal in the center, the iron will melt readily and rapidly.

This assumes of course that the furnace is in good working order. High temperature cannot be achieved in a furnace where the grates are clogged, or where there is not a good draft in the flue and chimney. If the proposed castings are to be soft and machinable, it may be necessary to add a little ferrosilicon, or ferromanganese, or both, to the scrap charge. As an alternative measure, it might be interesting to throw iron and charcoal into the crucible in a general mixture instead of in layers. This was the method employed by early cupola melters and the results were quite satisfactory when the work was done by an experienced operator.

High Zinc Content Causes Trouble

Q.—Can you give us any information on handling Navy specification 46M6 calling for 85 per cent copper and 15 per cent zinc? The castings are cylindrical and solid ranging fom 1 to 3¼ inches in diameter and 1½ to 19½ inches long. We understand the alloy is difficult to handle.

A.—The 85 per cent copper—15 per cent zinc alloy usually is produced in brass rolling mills although many castings also are made of the same composition. It is difficult to make castings of the alloy due to the high zinc content, but generally a small amount of aluminum is added to eliminate trouble from zinc smoke. However, the specification mentioned limits impurities to 0.04 per cent and iron to 0.08 per cent, or a total of 0.12 per cent. Consequently, permission would have to be obtained to use aluminum, and we understand that use of 0.10 per cent aluminum in the alloy has been permitted.

Presence of 0.10 per cent aluminum forms a thin film or skin on the metal, and reduces the smoke effect through decrease of zinc loss as well as providing a smoother skin on the castings. In making the castings you mention you might in some cases follow the rolling mill practice in making billets. That is to use an iron mold and pour vertically. The mold is tilted so that the metal runs down the side without turbulence and splashing, and as the mold becomes filled it gradually is moved to the vertical position.

In using sand molds, the sand should be such that it will give a mold which is open in structure and highly permeable. Gating of the castings will depend on whether feeding since the alloy shrinks somewhat less than manganese bronze. In castings made horizontally, it is advisable to gate through a riser attached to one end. That end should be down at the beginning of pouring, and until the mold is filled. Then the position quickly is reversed so that the riser end is high, and additional hot metal poured into the riser.

If you decide to cast the bushings vertically in sand molds, it is advisable to tilt the molds as previously described for billets, and pour down the side until it practically is filled, and then straighten up the mold for final filling. Another procedure for vertical casting is to gate into the bottom, and fill the mold cavity nearly to the top of the riser section. Then quickly fill the remaining part with good hot metal. As you can see from the previous discussion, it is essential that the metal enter the mold without turbulence and agitation, and also that it be fed sufficiently to obtain solid castings.

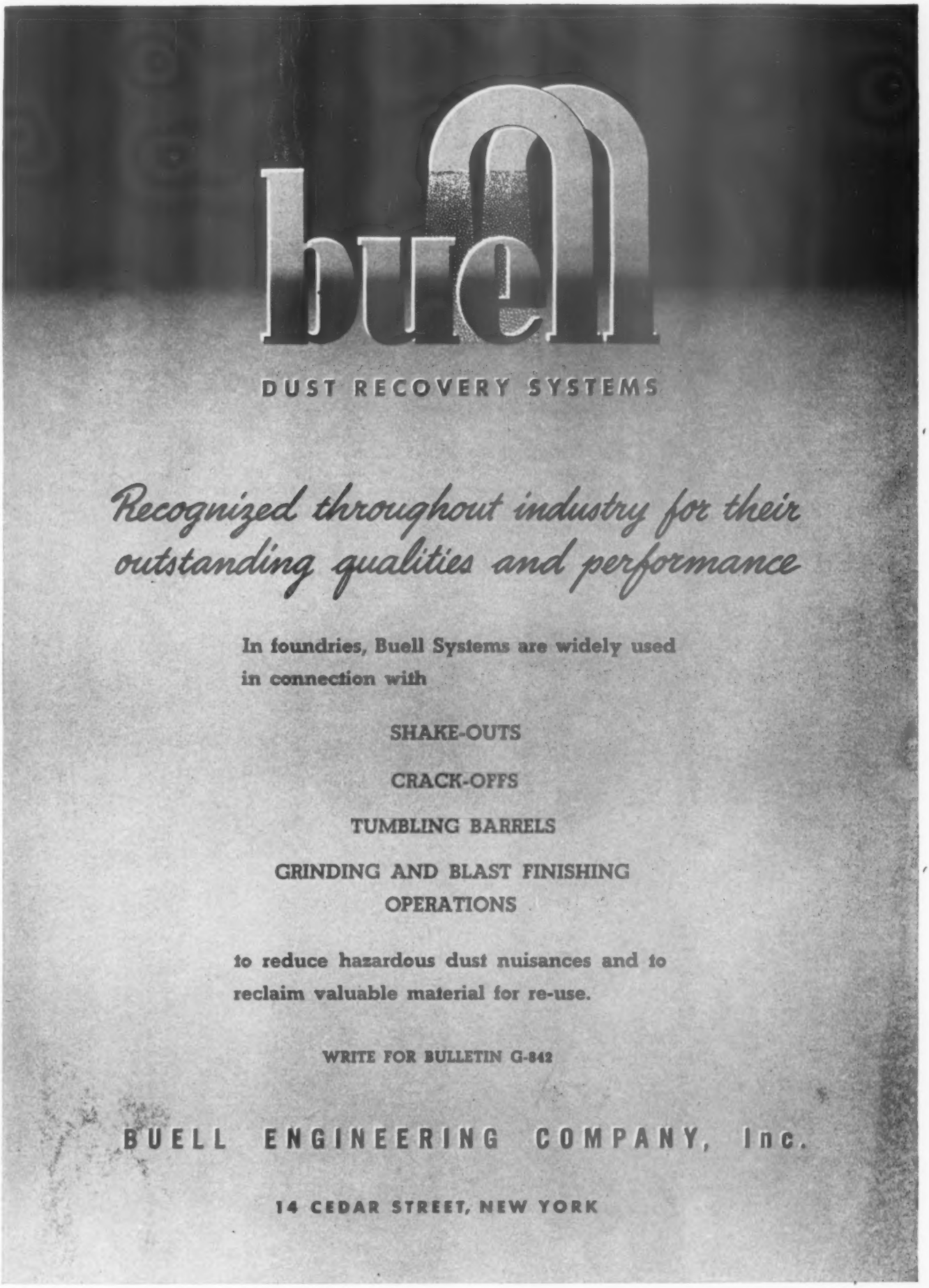
Undoubtedly you will have to do some experimenting to gain experience in handling the 85-15 alloy, but after you have done so, you will find that it entails no more trouble than with other alloys. It simply requires adequate experience, constant attention to detail, and accurate control of the different steps particularly that of maintaining a uniform alloy that is true to formula.

Explosion Wrecks Small Cupola

Q.—We operate a foundry in Mexico and not so long ago had a terrific explosion in our cupola which injured several men. The explosion occurred 53 inches above the tuyeres and blew the shell all to pieces—sending iron and firebricks 50 yards away. The cupola is 20.2 inches in diameter and the charges weigh 330 pounds with 30.8-pound coke splits. Iron and coke is broken into small pieces for charging. We have heard of carbon monoxide explosions occurring when the wind is turned on, but the cupola had been in operation with iron tapped good and hot for over one-half hour when the trouble occurred. Have you any idea what caused the explosion?

A.—Unfortunately, we can offer no definite solution for the explosion in your cupola—especially on the scale you describe, except for the possibility of dynamite or some other explosive being charged inadvertently. Years ago in this country, after the Civil War in 1865 a number of explosions occurred in cupolas due to melting of cast iron cannon balls from which the powder had not been removed. In other cases not so far distant explosions have occurred due to melting hollow objects, or water jacketed castings from which the water had not been removed. When those reached a high temperature, the steam formed let go with considerable force—in many instances with explosive force.

Like you, we doubt that the trouble arose from gases formed within the cupola since explosions of that type generally occur when the blast is placed in operation—after the cupola has been lighted for some little time, and the explosion would occur in the windbox or blast pipe, or possibly in the vicinity of the tuyeres.


buell
DUST RECOVERY SYSTEMS
Recognized throughout industry for their outstanding qualities and performance
In foundries, Buell Systems are widely used in connection with
SHAKE-OUTS
CRACK-OFFS
TUMBLING BARRELS
GRINDING AND BLAST FINISHING OPERATIONS
to reduce hazardous dust nuisances and to reclaim valuable material for re-use.
WRITE FOR BULLETIN G-842
BUELL ENGINEERING COMPANY, Inc.
14 CEDAR STREET, NEW YORK

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

MEN ...of Industry

WALTER L. SEELBACH, recently elected president of the Gray Iron Founders' Society, as reported on page 113 of this issue, is secretary and treasurer of Forest City Foundries Co., Cleveland. Educated in Cleveland and graduated from Case School of Applied Science of that city with a degree in civil engineering, he has been associated with the Forest City organization since 1910. Mr. Seelbach has been prominent for many years in various technical and trade associations. He is a past president and one of the organizers of the Gray Iron Institute, predecessor of the Gray Iron Founders' Society, a past president of the Ohio Foundrymen's Association and was formerly a director of the American Foundrymen's Association.

• • •

Herman Kluender has been elected a director of the Detroit Gray Iron Foundry Co., Detroit, and made vice president in charge of manufacturing for that company and its wholly owned subsidiary, Detroit Alloy Steel Co. For many years he has been vice president and director of the latter company. **James L. Blean** has been elected secretary and treasurer of Detroit Gray Iron. Formerly he had been secretary of Gerity-Adrian Mfg. Co., Adrian, Mich., and prior to that was associated for ten years with Harris Trust & Savings Bank, Chicago.

John Smyly has been named director of sales for both Detroit Gray Iron and Detroit Alloy Steel. Mr. Smyly was associated with various divisions of General Motors Corp. for 14 years. Immediately after Pearl Harbor he became staff advisor for WPB in Washington in charge of production for tank manufacturers and suppliers. More recently he has been in charge of heavy and medium tanks for the Chief of Ordnance at the Tank-Automotive Center in Detroit.

• • •

Grant S. Diamond, recently executive vice president, Electro Refractories & Alloys Corp., Buffalo, has been named president, succeeding the late Luke U. Milward. Two new vice presidencies have been established: **Carl F. Leitten,** in charge of manufacturing, and **Philip Donham,** in charge of finance. These are in addition to **C. A. Asher,** vice president, who continues in the same capacity. **William Enslin,** formerly assistant treasurer, has been made secretary, while **E. Halsey Brister,** formerly abrasive engineer, has been promoted to assistant plant manager.

• • •

Wally E. George, since 1937 assistant to the management, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has joined the staff of Booz, Allen & Hamilton, Chicago, management engineers. Before his association with Campbell, Wyant, & Cannon, Mr. George was head industrial engineer, American Steel Foundries, Chicago, where he handled wage incentives, job evaluation, time study and cost reduction work. He will specialize in these subjects in his new connection. Mr. George was president of the Chicago chapter, Society of Industrial Engineers, in 1934 and was the first president of the Industrial Management Society, from 1934 to 1936. For many years Mr. George has been active in the American Foundrymen's Association, at present being vice chairman of the Foreman Training, and Time Study and Job Evaluating committees.

• • •

W. J. Phillips, formerly assistant general manager of the Rochester, N. Y., plant of the Symington-Gould Corp., has been transferred to the miscellaneous steel castings sales division with offices at 230 Park Avenue, New York.

• • •

M. Ernest Graham, recently associated with the Niagara Alkali Co., Niagara Falls, N. Y., has been appointed to the research staff of Battelle Memorial Institute, Columbus, O., and assigned to

(*Continued on page* 136)

JAMES L. BLEAN

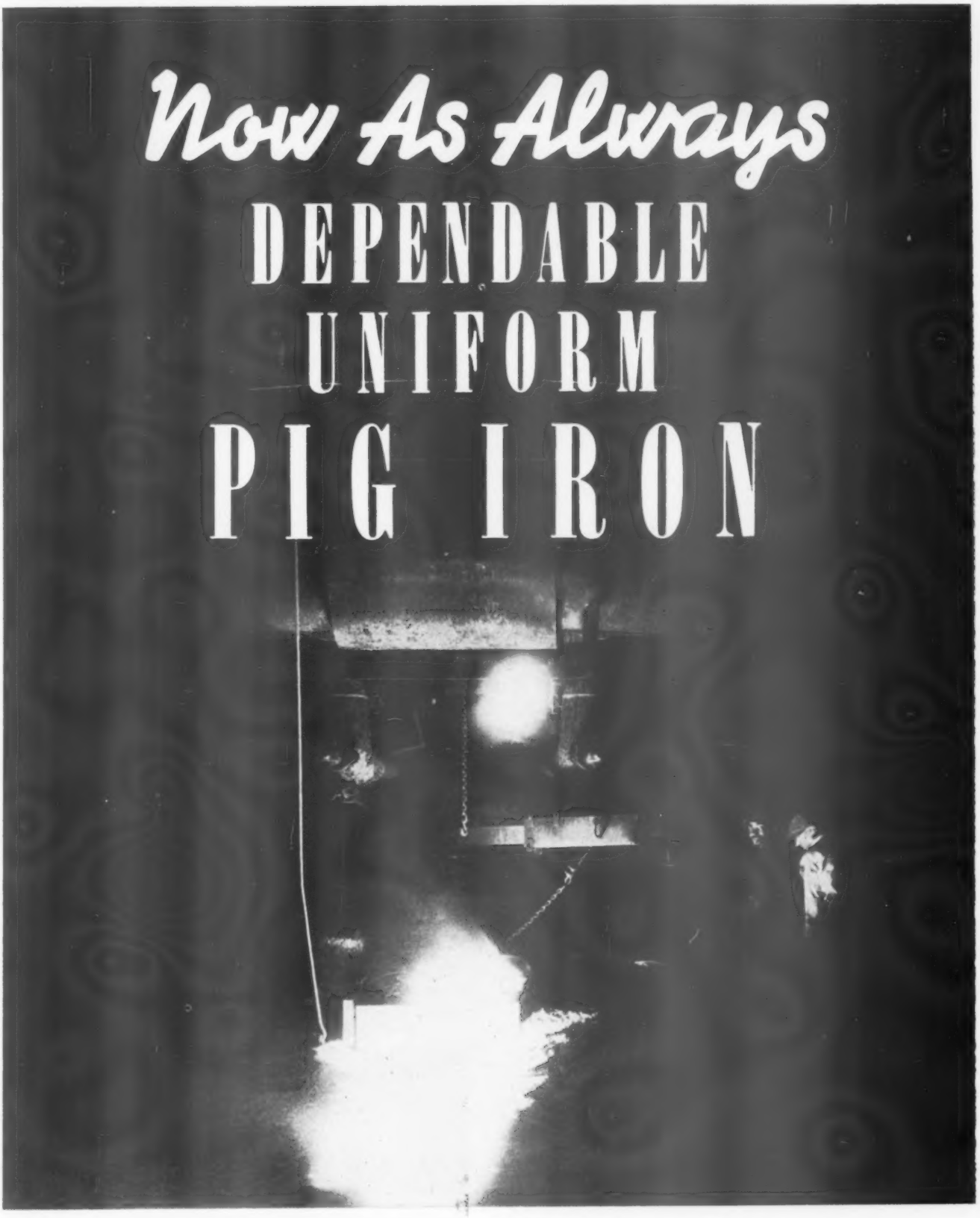
JOHN SMYLY

HERMAN KLUENDER

WALTER L. SEELBACH

Now As Always

DEPENDABLE UNIFORM PIG IRON



WOODWARD IRON COMPANY

WOODWARD, ALABAMA

America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

INDEPENDENT SINCE 1883

(*Continued from page* 134)

its division of nonferrous metallurgy. **Arthur B. Westerman** has been assigned to the institute's division of physical metallurgy. Previously he had been associated with the metals research laboratory of Carnegie Institute of Technology.

• • •

C. Edward Westover, formerly executive vice president, American Foundrymen's Association, has joined the staff of Grede Foundries Inc., Milwaukee. His new duties take him back into the foundry business on the executive staff with special engineering and administrative responsibilities.

• • •

A. J. Brown has been placed in charge of the Pacific Coast branch of the Whiting Corp., Harvey, Ill. Mr. Brown, whose headquarters are at 1151 South Broadway, Los Angeles, will supervise all sales and engineering activity for all Whiting products in California, Oregon and Washington. The change also includes transfer of the aviation force, headed by H. B. Doll, from its former location at 6381 Hollywood Avenue. Mr. Brown has been associated with Whiting Corp. in an executive capacity for the past 14 years, devoting much of this time to standardization and development work. Prior to that he was with the Allis-Chalmers Mfg. Co. for 28 years on engineering work.

• • •

Robert Doelman has joined the staff of the Harry W. Dietert Co., Detroit, as foundry sand technician and at present is engaged in research work. Mr. Doelman gained experience in the laboratory of the Dietert company in 1940, following a period of practical molding and coremaking apprenticeship at various Toronto foundries, and later went with Electric Steels Ltd., Three Rivers, Que. Until recently he was in charge of the sand department, sand control and research laboratory of the latter company.

Lowell L. Henkel, since May, 1942, senior industrial specialist, technical development section, War Production Board, Chicago, has been appointed technical advisory consultant, Smaller War Plants Corp., Washington. In his new position, he is one of the two Washington representatives of the technical advisory service, a new service instituted by SWPC to supply informational aid to small manufacturers. For 8 years prior to entering government service in 1942, Mr. Henkel was research engineer, metallurgist and chemist, Interlake Iron Corp., Chicago. He was chairman of the Chicago Chapter, American Foundrymen's Association in 1941-42.

HENRY H. SCHLICHTER

Henry H. Schlichter, for 20 years on the sales staff, Beardsley & Piper Co., Chicago, has been appointed sales manager. Prior to joining the Beardsley & Piper organization, he was associated with the Henry E. Pridmore Molding Machine Co., Chicago, for 13 years.

• • •

John W. Reid, new chairman of the New York Metropolitan Chapter of the American Foundrymen's Association, is metallurgist for R. Hoe & Co., Dunellen, N. J., with whom he has been affiliated since early 1941. Previously he had been associated with Robins Conveyors Inc., Passaic, N. J., for 23 years, and prior to that he was a bridge engineer for the Chicago & Alton and Chicago, Milwaukee, St. Paul and Pacific railroads. He is a graduate of the University of Wisconsin in civil engineering. Mr. Reid has been active in foundry organization affairs for a number of years.

• • •

Edmund H. Eitel, since July, 1941, associated with WPB and its predecessor OPM in Chicago, has resigned to join the staff of Booz, Allen & Hamilton, Chicago, management engineers. His work will mainly concern postwar planning. Prior to 1941, Mr. Eitel was engaged in the manufacturing and utilities field.

• • •

R. S. Arnold has been appointed assistant to M. R. Minnich, sales manager of the American Welding & Mfg. Co., Warren, O. Mr. Arnold was formerly manager of the Ideal Foundry Division of the Republic Steel Corp., Newton Falls, O. A native of Pittsburgh, he attended Carnegie Institute of Technology and Cornell University.

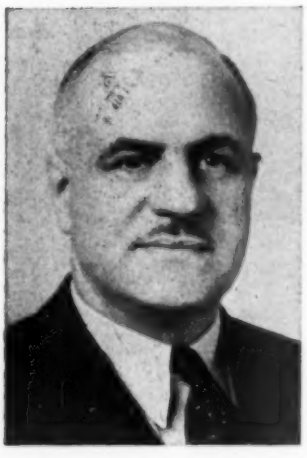
• • •

Frederick H. Bucholz has been elected president of the Omaha Steel Works, Omaha, Nebr., filling the vacancy created by the death of John W. Towle. **Karl E. Vogel,** formerly second vice president and general manager, has been elected executive vice president, and **Paul H. Leussler** has been named a director and second vice president.

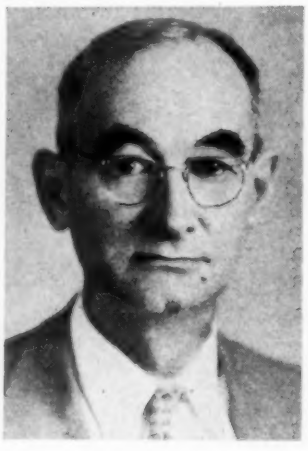
• • •

Fred T. Turner and **Page A. Mead,** Pittsburgh and eastern New York state representatives, respectively, in sale of industrial brushes for Osborn Mfg. Co., Cleveland, have been transferred to the home office for special assignments. **Presley Katz,** transferred from the Chi-

(*Concluded on page* 138)



C. EDWARD WESTOVER



A. J. BROWN

ROBERT DOELMAN

LOWELL L. HENKEL

THE LAST DROP IS AS GOOD AS THE FIRST

Ask the Men Who Use It!

HITLER IS BEING "DROWNED-OUT" WITH AMERICAN CASTINGS:

When it comes to producing the finest castings for the vital implements of war—you can't equal American made products! The UNIFORM quality of DAYTON Core Oils used in the casting of so many of these products is doing much to finish off Hitler and his gang. Are YOU overlooking a bet? Get the facts NOW about these BETTER Oils!

the

DAYTON OIL COMPANY

DAYTON • OHIO

STEEL CORE AND MOLD WASHES • BINDER AND CORE PASTE • CORE WASHES • CHILL COATINGS

(*Concluded from page* 136)

cago territory, replaces Mr. Turner, and **Dean M. Boundy** takes Mr. Mead's place. **Lloyd H. Ross** succeeds Mr. Katz in Chicago.

♦ ♦ ♦

Charles F. Dickinson has been appointed assistant manager, metallurgical division, Carnegie-Illinois Steel Corp., Chicago district. He succeeds **L. J. Rohl** who was recently promoted to manager of the department. Mr. Dickinson has been connected with the company since 1937 and recently was metallurgical engineer at Pittsburgh in charge of sheet and strip products.

♦ ♦ ♦

Fred E. Owen, formerly vice president and general manager, Paxton & Vierling Iron Works Inc., Omaha, Nebr., has been elected president and general manager. As president, he succeeds D. T. Molthop, who sold his interest and severed his connection with the company Sept. 1. **C. T. Betcke** has been elected vice president; **B. F. Owen,** treasurer; and **H. D. Coe,** secretary.

♦ ♦ ♦

A. N. Morton has been appointed vice president and director of Mack Mfg. Corp., Long Island City, N. Y. Formerly factory manager of the corporation's Plainfield, N. J., plant, more recently he had been production manager at Plainfield and New Brunswick, N. J., and Allentown, Pa., a position he will retain.

♦ ♦ ♦

G. Fred Hogg has been appointed sales director of the naval stores department of Hercules Powder Co., Wilmington, Del. Associated with the company since 1929 he was recently technical assistant superintendent at the Hercules, Calif., explosives plant.

♦ ♦ ♦

Morris Isaacson, for the past several years sales manager, R. Lavin & Sons Inc., Chicago, has been elected vice president.

♦ ♦ ♦

Raymond Cox has been appointed general sales supervisor of Standard Horse Nail Corp., New Brighton, Pa., succeeding U. S. Couch, former secretary and sales manager, resigned.

♦ ♦ ♦

George D. Thompson, chairman, Pittsburgh Steel Foundry Corp., Glassport, Pa., has been elected to membership in the Chamber of Commerce of the State of New York.

♦ ♦ ♦

Jarl A. Havnen, assistant metallurgist, Lynchburg Foundry Co., Lynchburg, Va., has resigned his position to enter the United States Corps of Engineers, Camp Claiborne, La.

Warns Against Delay In Postwar Plans

Manufacturers and businessmen must start now to plan for postwar activities if jobs and goods are to be provided promptly when termination of the war removes the outlet for over half of industry's total output. This warning was given by Paul Hoffman, chairman, Committee for Economic Development, at a recent Washington meeting.

"Such planning should be of a bold and ambitious type," he declared. "It will be fatal to be cautious—the market will be there, the money will be there, and manufacturers must be ready with the goods in the least amount of time." Mr. Hoffman urged that the aim be a high level of productivity, rather than merely full employment. The latter, he said, infers merely sharing the work, but work sharing can bring prosperity to neither management nor employes unless business volume is large.

The Committee for Economic Development is a private non-profit organization completely independent. It has the active support of the United States Secretary of Commerce, but is neither an official nor semi-official agency of government. It is financed entirely by contributions from private business. The committee is not an over-all postwar planning agency. Its aim is not to do planning, but to stimulate and aid companies to plan for themselves.

The committee is organized into two main divisions—research and field development. The research division is concerned with the creation of an environment in the postwar period favorable to the expansion of business enterprise. This includes study of problems involved in achieving and maintaining high employment and production, study of incentives for business enterprise and the impact of taxation, and studies of the economic problems of postwar reconversion and expansion.

Operates Through Small Groups

The field development division has the responsibility of encouraging and helping individual businesses in postwar planning. To accomplish this a regional chairman has been appointed for each federal reserve district, and district chairmen are named for approximately each one million population. The latter in turn appoint community chairmen. John Fennelly, general manager of the committee, reported that 850 community committees so have been organized and are doing a "grass-roots" planning job. Particular attention is being paid to utilization of the smaller plants capable of employment of less than 100 workers.

Leading industrial designers also are working on the project with the New Products Committee of the Committee for Economic Development. In addition, the latter is co-operating with such organizations as the American Association of Advertising Agencies and the Association of Consulting Management Engineers for co-ordination of postwar planning.

Mr. Hoffman pointed out that private industry must shoulder the large part of the re-employment load after the war. The entire program of the National Resources Planning Board, plus the public projects of all the states and communities could not provide more than some 3,000,000 jobs, he stated.

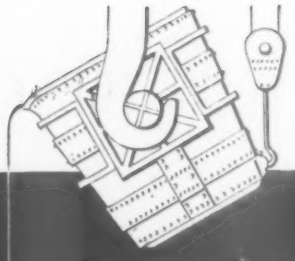
Asked whether government-owned plants should be turned over to small or large industry after the war, Mr. Hoffman said it did not matter; the main thing is to get these plants into the hands of people who will put them into operation.

Since **Robert C. Wellman,** advertising representative of THE FOUNDRY, has entered the armed services as an ensign in the Navy (THE FOUNDRY for October, page 124), his territory will be taken over by two other members of the advertising staff. **A. L. Klingeman,** Central Western manager with headquarters in Cleveland, will cover Western Pennsylvania in addition to Ohio. **George A. Pope,** Western manager with headquarters in Chicago, will cover the state of Michigan in addition to the Chicago territory.

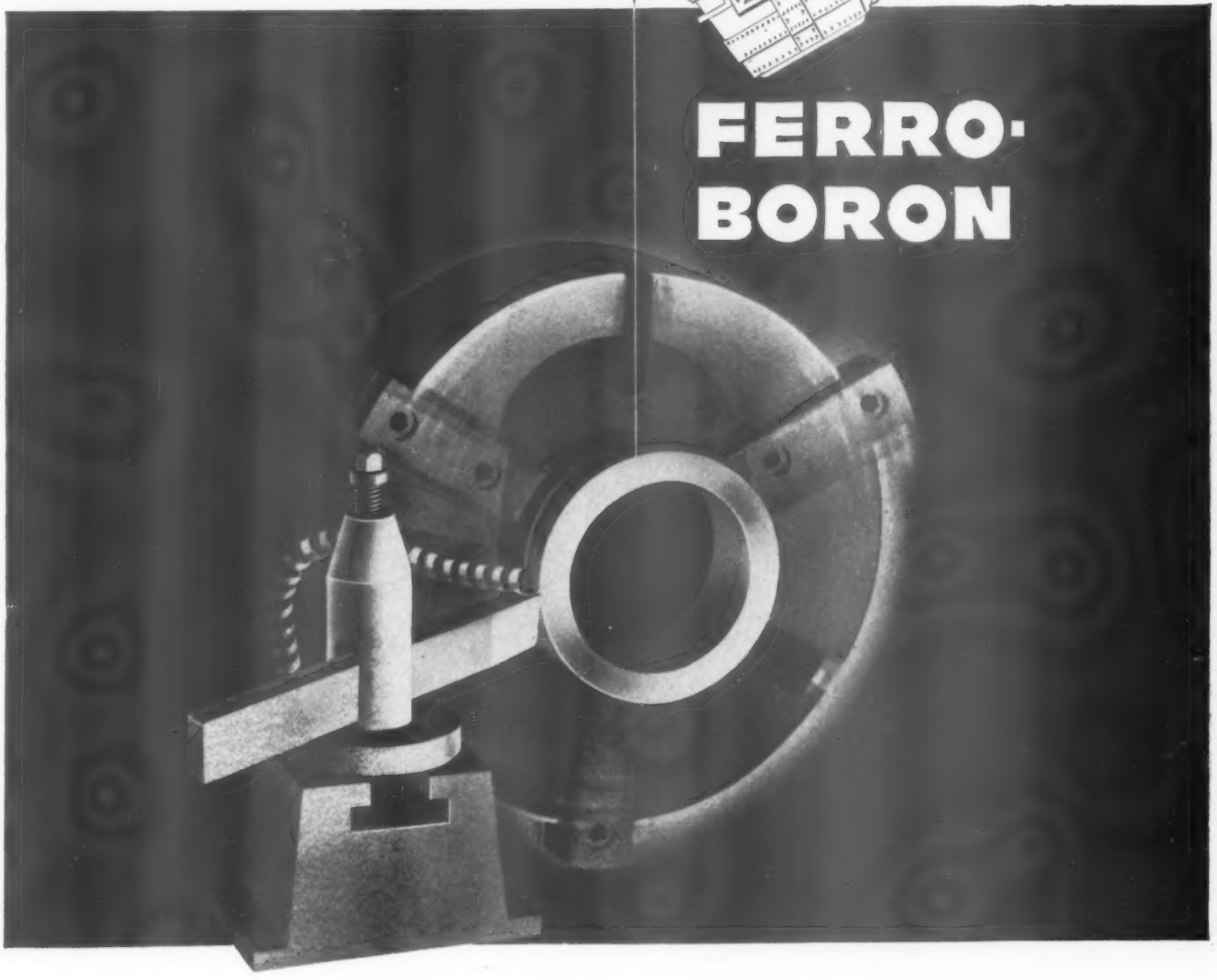
A. L. KLINGEMAN

GEORGE A. POPE

Malleable Irons find use for



FERRO-BORON



Strength and toughness are the special qualities for which Malleable Iron is valued. Research is constantly employed to make these physical properties more dependable; and engineers govern their uses of Malleable Iron accordingly.

A recent advance has been the addition of Boron to the list of alloying elements. The Molybdenum Corporation, being a very large producer of Boron alloys, has developed a Ferro-Boron which dissolves readily in iron at ordinary casting temperatures, without elaborate preparation, and under standard foundry procedure.

Inquiries are invited on any use of Molybdenum, Tungsten, or Boron, and specifically on the use of Ferro-Boron for the improvement of Malleable Irons.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

FOUNDRY DEVELOPMENTS
At short range

ONE aluminum foundry now is feeding "conditioned air" across the tops of its melting pots to reduce pick-up of oxygen and hydrogen from air-borne moisture to a minimum. Incoming air is passed through two dehydrating units containing activated alumina, and leaves with a moisture content of ½ grain or less per cubic foot. The dry air then is fed over the tops of the melting pots. The equipment used will process 400 cubic feet of air per minute which is ample for the 16 melting pot furnaces served by the system.

♦ ♦ ♦

SAID to be equally effective with brush or spray operation, a small quantity of a newly developed liquid paint deodorant mixed with any paint, varnish or enamel will eliminate the usual odors completely. Its application is claimed to be especially valuable when painting must be done indoors since it decreases time-out and illness due to allergies, nose, throat and eye irritations, etc. The product does not affect color, drying or durability of finishes, and 1 quart will neutralize 200 gallons of paint, varnish or enamel. Its use in maintenance painting permits normal activities to continue while premises are being painted.

♦ ♦ ♦

A suggestion to the War Production Drive Committee by Roy A. Burgess, pattern vault helper, Crane Co., Chicago, resulted in protection of patterns from damage. The idea, simplicity in itself, is to install angle-iron or wood cleats on the flat bottom trucks used in transporting patterns from section to section. The cleats are placed various distances apart on the bottom of the trucks which have vertical end pieces. The cleats accommodate different size patterns, and hold them in place over bumps and inclines during transit.

♦ ♦ ♦

PAMPHLET reprinted from the *Industrial Bulletin* published by the Industrial Commissioner of the State of New York, Albany, N. Y., discusses "Injuries Resulting from Light Metal Splinters and Abrasions," and pertains mainly to those containing some magnesium. While there is considerable difference of opinion on whether magnesium is the cause of difficulty with such wounds, the advice given is sound —that is to get the employes to present themselves promptly to the medical department when there has been any injury whatever or any abrasions of the skin. Also dust should be controlled, protective uniforms used, etc.

♦ ♦ ♦

A new bonding process using a synthetic material is claimed to be stronger than riveted or spot welded joints. Surfaces to be joined are brushed, sprayed or dipped into the material, and after drying, mild heat and pressure are applied. The material can be used to join iron, steel, stainless steel, magnesium, aluminum, copper, bronze and brass as well as rubber, plastics, leather, wood, etc. The material is not affected by fresh or salt water, is non-corrosive to metals, possesses corrosion resistance, and high dielectric strength.

♦ ♦ ♦

ONE procedure described in U. S. Patent No. 2,314,839 is claimed to give clean, solid castings. It consists of arranging the mold so that the air and mold gases are removed before and during pouring by a pump.

♦ ♦ ♦

ACCORDING to one investigator a suitable solder for aluminum bronze is composed of an alloy containing 52 per cent zinc, 18 per cent aluminum and 30 per cent tin. Due to the aluminum and zinc content it is possible to build up a solid alloy with the bronze. The solder is made by melting the aluminum in a graphite crucible under a cover of coal at 750 degrees Cent. (1382 degrees Fahr.), and then the zinc is added in small quantities; stirring in thoroughly. Finally the tin is added and after again mixing the alloy is poured into molds.

♦ ♦ ♦

POURING of aluminum into thin section castings necessitates the use of higher temperatures than are desirable, and leads to coarse grain structure in the casting although that sometimes is obscured by the presence of dissolved gas. Grain refining can be accomplished through additions of small quantities of alloying agents such as columbium, titanium and boron. The first two generally are added in the form of "hardener" while boron is added in the form of a flux containing a salt of the element. Amount of columbium used is 0.10 per cent while that for titanium is 0.15 per cent.

A magnesium alloy which is said to possess higher properties at elevated temperatures, and designed for use in pistons is described in U.S. Patent No. 2,314,024 as containing 1 to 4 per cent aluminum, 1 to 4 per cent cadmium, 3 to 12 per cent copper, 0.1 to 0.5 per cent manganese, 0.05 to 0.2 per cent calcium and remainder magnesium. The alloy is said to be operable at 400 to 600 degrees Fahr. without marked deformation and to retain its tensile strength and yield point.

♦ ♦ ♦

A Mid-west foundryman has developed and patented an aluminum alloy which may be cast, rolled or forged. The new metal immediately after casting has a tensile strength of 28,000 pounds per square inch. A week later, through natural aging process, the strength is claimed to have been increased to 38,000 pounds per square inch. The alloy primarily was developed to secure high tensile strength without the necessity of putting the parts through a heat treating process. Typical castings in this alloy containing copper, nickel, chromium, magnesium and titanium show a dense, fine grain structure without any trace of porosity, shrinkage or segregation. The gating method is simple and in the majority of instances no feeders or sink heads are required.

♦ ♦ ♦

In its investigation of cast alloy iron crankshafts as applied to diesel engines the Cooper-Bessemer Corp., Mount Vernon, O., recently completed an interesting test. Using a 6-throw crankshaft cast in process A Meehanite iron which was 7 feet 8 inches long with 5¾-inch pins and journals to replace a forged steel shaft in an 8¾ x 11-inch diesel, no distress was apparent in the shaft after 20 million revolutions at 900 r.p.m. and 900 p.s.i. peak pressure. Then the shaft was run 20 million more revolutions at 900 r.p.m. and 1000 p.s.i. peak pressure without trouble. In a determined effort to break down the engine, it was operated continuously in a peak critical test for 6 days. During the night of the sixth day, a change in operating efficiency indicated that the shaft had failed. However, although the engine was operated for 12 hours after that indication, subsequent examination showed that the fracture extended only halfway through the shaft. E. B.

Three-Way Savings with TRULINE BINDER!

1 Faster Ramming. In the first place, Truline is easy to handle and mix. It develops an easy-flowing core sand with readily controlled green strength that has excellent core-box workability and rams easily to give smooth cores.

2 Faster Baking. Another advantage of Truline is that it forms a strong bond at a relatively low temperature—thus saves time in the baking oven.

3 More OK Castings! Truline burns out readily, allowing the core to collapse and knock out easily. This results in less clean-up time and, in addition, helps prevent hot-tears and similar defects.

How to obtain *more* production with less personnel! That's one of today's big headaches! But it's a problem Truline Binder is helping many foundries solve. Because Truline saving starts with the package—easy, convenient to handle—continues on through every step.

For further information or a sample, fill in the coupon below. No obligation.

TRULINE BINDER

REG. U. S. PAT. OFFICE

HERCULES POWDER COMPANY
INCORPORATED
999 Market St., Wilmington, Delaware

Please send ☐ sample ☐ information on how to use Truline Binder in casting:

(State type of work and kind of metal cast)

Name _____ Title _____

Company _____ City _____ State _____

Address _____

The Proof of the
is in the Eating

WHAT specific result are you looking for in blast cleaning equipment? Is it faster production — lower production costs—a more perfect cleaning and a better finish? Or is it some other factor such as improving inspection, speeding up machining, and increasing tool life?

Whatever your problem may be there is convincing factual evidence in the experience of over 2,000 users that the Wheelabrator will meet your requirements. A cleaning test on your own products will prove that to your complete satisfaction. Write today for complete information and literature.

HERE'S WHAT FOUNDRY USERS SAY ABOUT WHEELABRATOR AIRLESS BLAST EQUIPMENT

ARMY E NAVY

THE AMERICAN MOLDER

TRADE MARK REG. U. S. PAT. OFF.

World's Largest Builders of A

Pudding

"DOES A WONDERFUL JOB OF CLEANING"

"Your machine certainly does a wonderful job of cleaning and does it in an unbelievably short time. We are able to ship to our customers a day earlier on account of the time saved. The appearance and machinability are much improved over a tumbled casting. The castings come true to pattern, and breakage is practically eliminated."

— An Illinois Mfg. Co.

"DON'T SEE HOW WE GOT ALONG WITHOUT IT"

"The two Wheelabrators which we operate in our Cleaning Department amply take care of the cleaning of approximately 95% of our malleable castings, and a goodly portion of our gray iron castings. The third machine was installed about a year ago in our Hard Iron Cleaning Department. In this department we formerly tumbled our castings, but we were able to do only a portion of this work, because of the resultant breakage of castings. Today we are cleaning practically one hundred percent of the hard iron castings with no difficulty in breakage. The question in our minds is how we were able to get along so many years without this method of cleaning castings."

— A Wisconsin Foundry

"TOOL WEAR MATERIALLY CUT DOWN"

"We replaced eight large mills with one Wheelabrator and put through larger tonnages by about 40% than we had ever put through our Mill Room before—and did it easily, which we know could not have been possibly done working over time with tumbling mills.

"We haven't figures to show what saving in the machine shop cost is, but the machine shop foreman tells me that his tool wear and breakage has been materially cut down and he is able to machine most items at higher speeds than he did formerly. One thing is sure and that is that you get all the sand and scale removed right down to the bare metal."

— An Iowa Manufacturer

24 HOUR JOB REDUCED TO 7 HOURS

"The addition of this equipment to our cleaning machinery has been a step in the right direction. Prior to the installation of the Wheelabrator, we had been operating nine tumbling churns and one sand blasting cabinet. These, we were obliged to run continuously 24 hours a day and then we were never caught up in our cleaning. Frequently, we had very unsatisfactory conditions arising because of not being able to clean up each day's castings before the succeeding day's output was added to the stock of uncleaned castings. We are now able to have an entire day's production of castings cleaned within about seven hours."

— A Pennsylvania Foundry

"AN INDISPENSABLE PIECE OF EQUIPMENT"

"With the Wheelabrator we are able to clean all of our brass castings with one man working about four hours each day, and the iron castings are cleaned by one man working about three hours on the second shift. This compares with three men working twenty hours each day with the previous method. Another saving is that we were able to shut down a large Air Compressor with an 80 H. P. motor. The Wheelabrator is now an indispensable piece of equipment in our plant."

— An Eastern Mfg. Co.

American

FOUNDRY EQUIPMENT CO.

505 S. BYRKIT ST. MISHAWAKA, IND.

of Airless Blast Equipment ★

Among DETROIT Foundries

BY A.H. ALLEN
Detroit Editor,
The Foundry

IN THE EARLY 1930s, Ford metallurgists undertook a research program on malleable iron with the aim of perfecting a material which would show improved physical properties over commercial malleable and one which would respond to the malleablizing heat treatment more readily, with a shorter malleal lizing cycle. In the past 10 years this work was not pushed forward too rapidly, because the Ford foundries were busy on other types of castings, and what malleable was needed at the Rouge was largely bought on the outside. However, as mentioned in these pages last month, Ford is now making malleable of the type originated by the previously mentioned research. It is going into rear axle housings and a number of other cast parts for trucks, armored cars and related ordnance units.

Further details have come to light on the properties of the material, its processing and heat treatment. Typical analysis shows 2.25 per cent carbon, 0.38 per cent manganese, 1.54 per cent silicon, with phosphorus and su'phur not over 0.08 per cent. Both cold melting and duplexing processes are used, and experiments point to the suitability of the triplexing process as well. Cold melting is done in acid e'ectric furnaces and conforms to conventional cold melting practices, with the charge comprising 50 per cent malleable gates and risers, steel scrap and some pig iron.

Use Open Taphole

In duplexing, the cupola is lined to 48-inch inside diameter and, by operating with an open taphole the hot metal is allowed to run into a large forehearth type of ladle to avoid too much contact between the metal and the coke in the bed, thus holding carbon contents down around 2.25 per cent.

From the forehearth the metal is transferred to the electric furnace which serves more or less as a holding furnace in which necessary analysis corrections can be made. Ford engineers point out that the same malleable iron can be me't-ed successfully by triplexing, blowing the hot cupola metal in the bessemer converter and then combining this product with additional iron direct from the cupola in the electric furnaces.

Prevention of cracks and hot tears in malleable castings calls for particular care in checking molding sand and core sand mixtures. Every half hour sand samples are brought to a central laboratory where they are checked for bond, permeability and moisture, and dry strength of the core sand.

Recommended heat treatment practice for the Ford malleable calls for continuous furnaces which provide the optimum uniformity and atmosphere control. In this type of furnace, malleable has been heat treated in only 18 hours. At the moment, however, Ford does not have this type of equipment available to handle production tonnages, so a group of batch-type heat treating furnaces, orig-inal'y installed for normalizing cast steel armor plate, was adapted to the malleablizing operation.

Load Castings in Furnace

General practice in heat treating malleable castings is to place them in annealing boxes along with spent ore or crushed slag as packing material, which results in some increase in the time required for malleablizing and extra cost for handling and for annealing boxes. In adapting the batch furnaces for handling malleable, Ford metallurgists decided to load the castings directly into the furnaces, and to place trays containing a predetermined amount of coke in the furnace along with each load of castings to avoid the difficulties which might result from an oxidizing atmosphere.

Results have exceeded expectations, and the treated castings are reported almost entirely free from "picture frame" — malleable fracture showing outer boundary of pearlite formed as the result of absorption of oxygen. Heat treat cycle for the average run of castings is approximately as follows: Heat to 1700 degrees Fahr. and hold for 15 hours; then cool in still air to below 1200 degrees. Reheat to 1380-1400 degrees and hold for 8 hours; then cool in the furnace at the rate of 50 degrees per hour to 1100 degrees. Remove the castings from the furnace and quench in water. Resultant physical properties average 57,000 pounds per square inch tensile strength and 16 per cent elongation.

Saginaw Malleable Iron Division of General Motors, now producing both steel and malleable castings at a rate in excess of 300 tons a day, is making further extension to facilities for malleable. Steadily mounting requirements for the large military truck program planned for 1944 have meant unrelenting pressure on malleable shops, although it is beginning to appear that a realistic appreciation of the manpower situation may force some scaling down in the ambitious truck program which Ordnance Department has unfolded to the truck industry.

* * *

New foundry equipment projects are confined principally to postwar plans, although there are a few at the active stage now. Wickes Boiler Co., Saginaw, reportedly is considering extension of its gray iron foundry. This company has been greatly reinforced in its financial position as a result of war production activity, much of it work for navy ships, and additional capacity is needed at the moment.

No further developments have been announced with respect to plans for setting up centrifugal casting equipment at the Cadillac foundry for production of Allison engine cylinder barrels. However, it is known that Cadillac foundry engineers have visited centrifugal casting installations at the Ford plant here and at American Cast Iron Pipe Co. in Birmingham, Ala., to study methods and equipment. Success of centrifugally cast barrels in the Pratt & Whitney engine being built by Ford might indicate the feasibility of a change from forged to cast barrels in the 12-cylinder Allison and in the new 24-cylinder Allison now understood to be in production in Indianapolis.

Postwar Planning

Foundry equipment suppliers naturally are making no commitments on price or deliveries for postwar installations. Nevertheless one gray iron foundry in the Detroit area is definitely planning on having its foundry and machine shop capacity operating on automobile work at 50 per cent of the 1941 level by March 1, 1944, and 150 per cent of the peacetime level by Dec. 1, 1944. This indicates to what extent belief in termi-ation of the European war by the end of this year has progressed in the motor

(*Concluded on page* 146)

THE *Strategy* OF MAN-POWER

RELIEVING VITAL MAN-POWER of unnecessary fatigue . . . avoiding unnecessary handling . . . saving unnecessary steps . . . keeping a constant flow of material moving to waiting hands and machines, that's man-power strategy headed towards victory.

America's war industries from coast to coast are improving their per-man-and-machine-hour production schedules with the aid of Mathews Time-Coordinated Conveyer Systems.

If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION

MATHEWS CONVEYER COMPANY

ELLWOOD CITY
PENNSYLVANIA

(*Concluded from page 144*)

industry. It appears even beyond the wishful thinking stage.

Equipment prices likely will be somewhat higher when ceiling prices are lifted. One line had increased 10 per cent when ceilings were imposed and had to be adjusted downward by this percentage. Consensus is that restrictions of this type will have to be lifted with the return to peacetime production, which will mean a minimum of 10 per cent immediate increase in equipment prices.

A leading parts supplier has voiced the estimate that automobile production costs will be approximately 30 per cent higher when output is resumed, the bulk of this accounted for by higher wage rates and lower productivity of labor. Materials, though frozen now, logically can be expected to lift their price level when controls are removed.

C. F. Kettering, General Motors Research chief, speaking here the other evening before a group of metallurgists about significant metallurgical discoveries, mentioned the Antioch process for casting aluminum in plaster molds which the corporation purchased from its originators at Yellow Springs, O., some years ago. He stressed the fact that this casting process results in exceptional improvement in density, strength and fatigue life of aluminum castings, but that no logical explanation for the improvement has yet been advanced. The gain in properties might reasonably be assumed to result from the "compacting" or "forging" effect on the metal induced by the rigidity of the plaster mold while the metal passes from the liquid to solid state.

Redesign of the superstructure of Rotary Electric Steel Co.'s blastola (cupola-blast furnace) has been necessitated by difficulties encountered in the early operating stages. No extensive amount of rebuilding of the stack will be required, but a considerable volume of design work is necessitated by the change. Principal construction modifications include bricking up the top part of the stack as a result of the intense heat of gases emerging from the melting unit.

Vocational Training Committee Named

Appointment of a consulting committee on vocational technical training to gather and distribute information on training for specific technical occupations has been announced by John W. Studebaker, U. S. Commissioner of Education. Headed by J. C. Wright, Assistant U. S. Commissioner for Vocational Education, the committee includes representatives of industry, labor, business, and several fields of education. The training under study, termed vocational technical training, is designed to prepare persons for definite technical occupations, such as laboratory assistants, operators and maintenance and repairmen of technical equipment, technical salesmen, and production supervisors, rather than for the more general professional engineering degrees.

Herman Pneumatic Wins Army-Navy "E"

Herman Pneumatic Machine Co., Zelienople, Pa., was honored at the plant ceremonies held in Zelienople, Oct. 1, when the Army-Navy "E" pennant was presented by Capt. F. L. Oliver, U.S.N. (retired), inspector of naval material in the Pittsburgh district. Presentation of the employe pins was made by Lieut. Col. Ralph L. Dunckel, chief, industrial division, Pittsburgh Ordnance District. Thomas Kaveny Jr., vice president, accepted the award in behalf of the firm, and Louis Mohr responded in behalf of the employes. The accompanying illustration taken in the plant after the award shows left to right Colonel Dunckel; E. J. Druschel, foreman assembly department; T. A. Renkenberger, works manager; Frank B. Bell, chief, Pittsburgh Ordnance District; Robert G. Kaveny, vice president; Capt. Oliver, and Thomas Kaveny, Jr.

Committee To Study Casting Inspection

Due to the growing demand for more critical inspection and more rigid specifications for war production castings, a new committee on inspection of castings has been set up by the American Foundrymen's Association. The new committee will stress means and methods for improving the quality of castings mainly from the purchaser's point of view. Heretofore, attention has been directed largely to meeting physical requirements through such tests as tensile, tension, hardness and other mechanical properties as measured by testing machines.

Results of the new committee's work will first be presented to the industry at the 1944 War Production Foundry Congress, to be sponsored by the association at Buffalo next April 25-28.

Members of the committee, for which no chairman has as yet been appointed, include the following: M. D. Johnson, chief inspector, Caterpillar Tractor Co., Peoria, Ill.; E. Platt, castings buyer, purchasing department, Sperry Gyroscope Co. Inc., Brooklyn, N. Y.; F. Poettgen, chief inspector, American Steel Foundries, cast armor plant, East Chicago, Ind.; C. K. David, chief inspector, Continental Roll & Steel Fdy. Co., East Chicago, Ind.; Harold Warner, inspection department, Allis-Chalmers Mfg. Co., Milwaukee; H. C. Stone, assistant metallurgist, Belle City Malleable Iron Co., Racine, Wis.; E. G. Leverenz, chief inspector, American Steel Foundries, Indiana Harbor Works, East Chicago, Ind.

Apprentice Training Pamphlets Offered

Two new pamphlets on the subject of apprentice training are being distributed by the Apprentice-Training Service of the War Manpower Commission, Washington. These are "St. Louis, Missouri, and Vicinity Machinists Apprenticeship Standards," and "Training Apprentices for War and Post-War Work." The latter is a second edition but a new section has been added entitled, "Adapting Apprenticeship to War Conditions." The other pamphlet was prepared to meet the demand for detailed information on the area-wide apprenticeship program in the machinist trade in St. Louis and vicinity.

SPEED THE CASTINGS . . SPEED VICTORY!

The castings that came out of your foundry last month are being loaded on ships as material of war today. Tanks, guns, ships, jeeps—all such equipment's delivery depends upon speedy production of castings to get the drop on the enemy.

• Speed of casting cleaning means a lot in keeping your production flow smooth and swift. Correct grinding wheels—built to your demands—are important for speeding up casting cleaning in your foundry. Foremen and operators alike ask for Sterling Grinding Wheels. They know from experience that these "Wheels of Industry" make work easier to turn out on time.

• Victory depends upon everyone pushing up the production curve to new heights today and every day. Dedicated to assisting in the task are Sterling engineers, skilled by everyday experiences in improving grinding practice in foundries all over the country. Results of their recommendations are your assurance that your foundry can also enjoy the benefits provided by carefully selected Sterling Grinding Wheels. A letter from you will bring a "Wheels of Industry" expert at no obligation. Write!

The No. 43 Catalog is a good "Production for Victory" Handbook to have on your desk. Send for it now!

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

the adventures of BILL

BY PAT DWYER

Drawings By RICHEY

I HAD a letter recently,," Bill remarked, "from one of the boys down in the old home town. The old gang is pretty well scattered all over the earth and I have lost track of the great majority. Never hear from or of them. Some of the liveliest boys and girls have been lying in their narrow graves for many years where the green sod lies above them with rain and dew drops wet. Where the kindly sun looks down by day and the moon and the stars keep vigil by night. Obviously I have lost touch with them except occasionally when a flash of imagination projects them on memory's screen. Out of the remainder, one or two hardy lads take their trusty pen in hand maybe once or twice a year to keep the narrow line of communication open."

"Isn't that the most extraordinary coincidence," I exclaimed in admiration. "I don't suppose there are more than a million people in this town who have not had a similar experience. Check over a list of 100 people, especially those over 50, and you won't need more than the fingers of two hands to count those born within the city limits. Who is the old fogy who wrote the letter and what has he to say for himself? Let me guess. The weather is rotten. No gas, no grub, no fun, the cow is gone dry, the chickens have the pip, his old woman has developed into a champion nagger and his feet are killing him. Otherwise everything is about the same. Drop us a line when you have the time. Your truly friend John Willie."

"Well," said Bill, "I'll tell you. If you have any intention of setting up as a mind reader or fortune teller, I should strongly advise against it. Stick to your own racket where at least you can fool some of the people some of the time. Leave the flights of imagination into the higher branches and all that kind of stuff to the gifted lads who compose and write national advertising copy. The retiring lads who modestly admit that without their valiant effort, the world would cease to move."

"Pray tell me how or why these nimble copy boys hopped into the present picture. Certainly they do not exercise their talents in your old home town. If you will kindly pardon me, I fail to get the connection."

"They hopped or popped into the picture because John Willie referred to them in his recent and highly esteemed communication. 'Tis true that these dynamic and high powered gents do not flourish in the modest little town, but newspapers and magazines presenting their brain children circulate as freely in the small towns as they do in the large cities. In fact if a comparison was made, I should not be surprised to learn that any given group of small town people read more than an equal group living within a street car ride of the palatial office from which the burning messages flow in a steady stream."

"The burning messages may flow in a steady stream for you, but up to the present I have not seen a flash of light. How about touching up this pillar of smoke with a jet of air?"

"Take it easy lad. Take it easy. We are now approaching the $64 question. John Willie concluded his letter as follows: 'Taking a more or less leisurely gander through a magazine the other day I ran across a full page advertisement extolling the merits of the cards you see stuck up in street cars and subway trains. According to the writer, this form of advertising gets more attention and better results than any other media (Media probably is the pettiest of the rather limited number of pet words in the advertising vocabulary). To prove and clinch his argument without peradventure of a doubt and all that kind of stuff, the writer cited some rather astonishing figures and drew certain conclusions that in my humble opinion would tax the strength of Hercules, the late John L. Sullivan and the equally late and lamented M'sieu Louis Cyr.' "

Honest citizen pauses to count ten

"What? No Tarzan or Superman?"

"John Willie remains loyal to the old boys. Where did I leave off? Reference to certain astounding statements. The letter continues: 'The writer points out that 165,000,000 people read the New York subway train ads every month. You may ask, how does he know how many people indulge in this sport. Simply by checking with the reported number of nickels collected at the turnstiles. One hundred and sixty five million people rode the trains in a month, therefore one hundred and sixty five million prospects read the cards. That's arithmetic, my boy and you can't dispute it. Or can you?' "

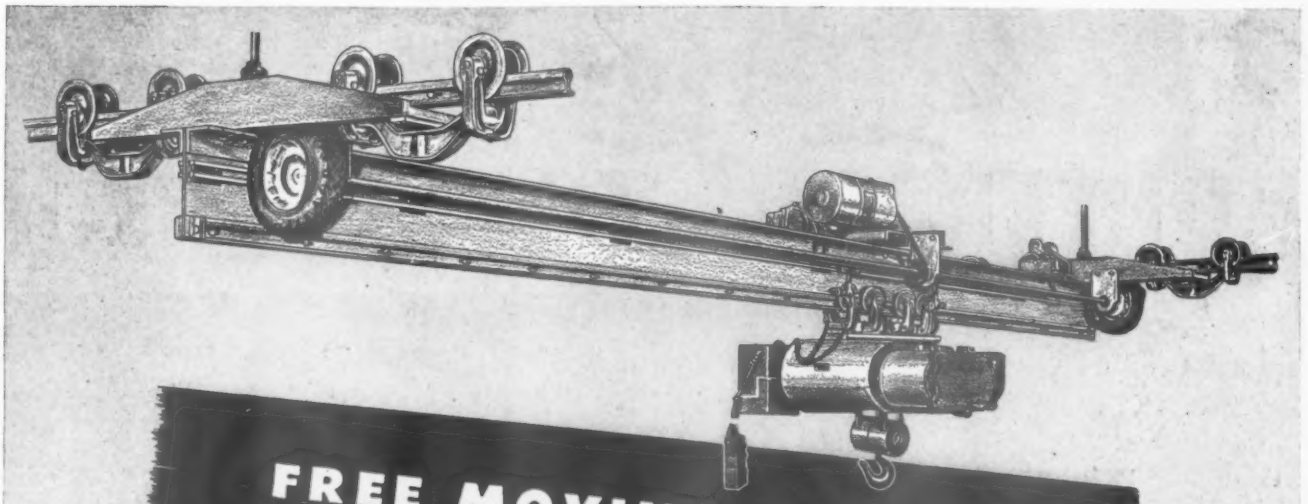
"Well," I admitted cautiously, "a kind of sixth sense warns me that a colored individual is concealed somewhere in the wood pile, but I can't just spot him off hand. Suppose you put your old haoun' dog on the trail."

"Arithmetic," said Bill, "is a wonderful science. With its aid you can prove anything. Set the gear shift forward and you can prove that 2 and 2 make 22. Set the gear shift in reverse and you can prove that 2 and 2 make 4. Set it in neutral, 2 over 2, the old gazinta trick, and the answer is 1.

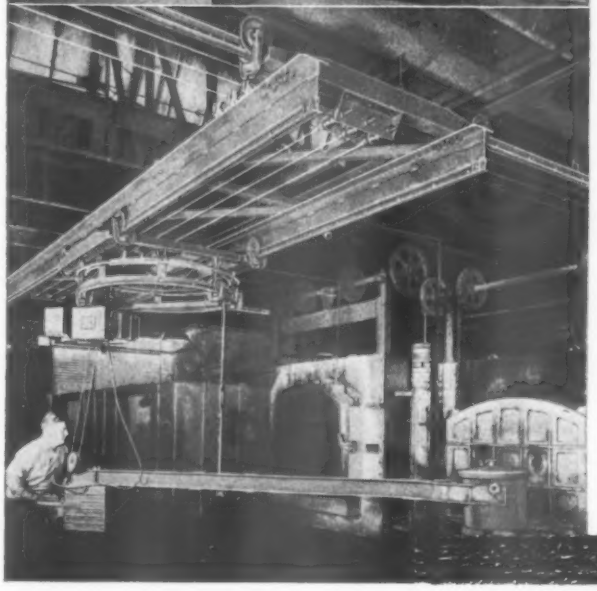
"Let's see what a bit of reverse juggling will do to the present problem. To conserve time, brain fag and paper we shall divide the monthly 165,000,000 by 30 to get the daily number of 5,300,000 people riding the trains. However, because the record shows that 5,300,000 nickels were collected, it does not mean that over five million *different* people passed through the turnstiles. At a conservative estimate over half that number, or say 3,000,000 made a round trip and paid 2 fares. Therefore the number of actual potential readers is cut down by 1,500,000. That leaves a total of 3,800,000 actual passengers. At least 2,000,000 of these are regular passengers either in the city or from points outside. The subway ride is part of the daily routine. The men either sleep or read newspapers and the women read the screen magazines or peep into their mirrors in the pitiful hope that a lucky fluke will lift them into the lap of ease and luxury. Car ads mean nothing in their young lives. They never look at 'em.

"We now have reduced the number

(*Continued on page* 151)



FREE MOVING CRANES AID WAR WORK

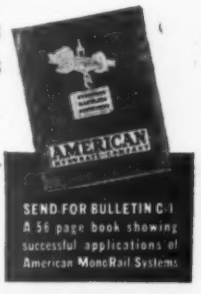


Flexible Design Permits later adaptability to regular production

Every American MonoRail System must be "made to order" and yet, these "tailor-made" systems are made from standard parts. Because of its extreme flexibility, American MonoRail offers a wide range of application without costly adjustment or lengthy engineering.

American MonoRail Cranes have proved to be invaluable in hundreds of installations. With the structural design greatly simplified, dead weight of the crane bridge is kept at the lowest point consistent with strength. This provides maximum live load capacity and requires less effort to move. Elimination of friction at all points by the scientific use of proper bearings make American MonoRail cranes the easiest of all to handle.

Let an American MonoRail Engineer consult with you.



Standard Crane Parts assembled into special unit at low cost to meet unusual production requirements.

THE AMERICAN MONORAIL CO.

13104 ATHENS AVENUE CLEVELAND, OHIO

For the . . .

NONFERROUS FOUNDRYMAN

Whether you melt your metal in stationary or tilting furnaces, use crucibles or crucible composition ladle liners for carrying and pouring.

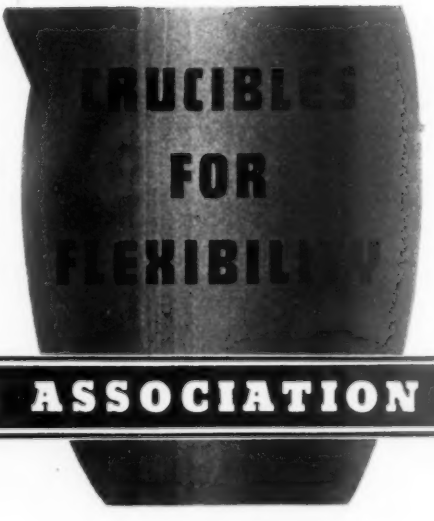
Available sizes range from a few pounds capacity to a thousand pounds or more.

Photo taken in the foundry of The Hobart Mfg. Co., Troy, Ohio (Courtesy The Austin Co.)

The smooth, graphite bearing surface of such containers reduces oxidation and gassing of metal, prevents contamination from inclusions, and eliminates the bother of lining ladles with refractory mixes.

The crucible shown in the illustration was used for melting in a high frequency induction type furnace.

Ask any Crucible Manufacturer about sizes and shapes available—or write The Association.



CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK, N. Y.

(*Concluded from page 148*)

of potential ad readers to 1,800,000. In a cosmopolitan city like New York I think it is safe to assume that at least 1,000,000 of these cannot read the English language. We can leave them out of any calculation. On a plain, cold and merciless arithmetical basis the number has been reduced to 800,000. A right goodly number you might say, but wait my friend. What about the dear little kiddies who not only are not interested in the ads, but have no means of purchasing anything even if they read every word and admired every illustration. Vital statistics show that the average family includes 1 father, 1 mother and 2 1/3 children. I often have wondered if that one third means a midget, but that point may be regarded as irelevant to the present discussion and therefore quite properly may be ignored. Let us stick to the figures—and trust that we do not get stuck.

"You do not need a slide rule to figure that in a miscellaneous group of 800,000 people the number of children will be 430,485, or let us say in round numbers 430,000. Eliminating the children leaves 370,000 adults who might or might not be interested in reading the ads. From this group we safely may remove 170,000 men and women with myopic vision. Cards to them are just so many meaningless splashes of color. These splashes convey to their minds just about the same amount of information, that a strictly modern painting conveys to the person with ordinary or normal vision. Consequently we write the 170,000 blinkers and peepers off the list, and that whittles the original 5,300,000 down to a measely 200,000. That is just about the exact number pushed and jammed by the guards into the cars during the rush morning and night.

"Can they, will they, or do they read the advertising cards? The answer, dear little Rollo is no, no, no! Thus by the same system of arithmetical progression we arrive at two diametrically opposite conclusions. The ad man calmly assumes that 165,000,000 different individuals traveled in the subway in a month's operation, and he bases this assumption on the fact that the railroad company collected that number of fares. Of course the assumption is ridiculous. The further assumption that every car rider is an ad reader is even more childish. My calm and orderly analysis of the situation proving that no person reads the cards may be slightly off the beam here and there, but I think, in a test, it would pass through the eye of a needle as readily as the advertisement."

"Very interesting case indeed, my dear Mr. Holmes," I said, "and a highly ingenious solution. Any other problems turn up recently?"

"Nothing, my dear Watson of any particular moment. I had an inquiry from a gentleman who stated that since his automobile business had folded he would like to turn to a commercial field of activity. He claimed he could obtain contract for 10 to 15 tons per week of malleable iron pipe fittings. He had a man capable of supervising a malleable foundry. He would appreciate my opinion on the following points: 1—Would it be advisable to start a foundry now. 2—Could he manufacture pipe fittings without war work. 3—Would he have difficulty in getting pig iron and scrap. 4—Does he need priority rating for pipe fittings. 5—Where can he obtain priority ratings. 6—Are permanent molds successful."

"Seems to me," I said, "you would have a bit of a job on your hands to guide that problem through the eye of a needle."

"Well, yes and no. I wrote him that during the course of a long and considerably varied life I had seen so many apparently impossible miracles performed that I hesitated to come out flatly and claim that he cannot make a go of the foundry business. However, I will say that if he does make a go of it, that will be another miracle. The cards are all stacked against him. In my opinion he might just as well spill any money he has down a rat hole, as to invest it in a new foundry at this time. If necessary or expedient I could give a great many reasons for this opinion, but probably a specific answer to each of the six questions would be sufficient.

"1—It would not be advisable to start a foundry now because he could not erect or equip a building without permission from the government, and the government will say 'No'.

"2—As with many other classes of castings, malleable iron fittings for civilian use are out for the duration. To be made they must have a war hookup of some kind.

"3—Difficulty is not the word. He cannot get either pig iron or scrap except under priority rating.

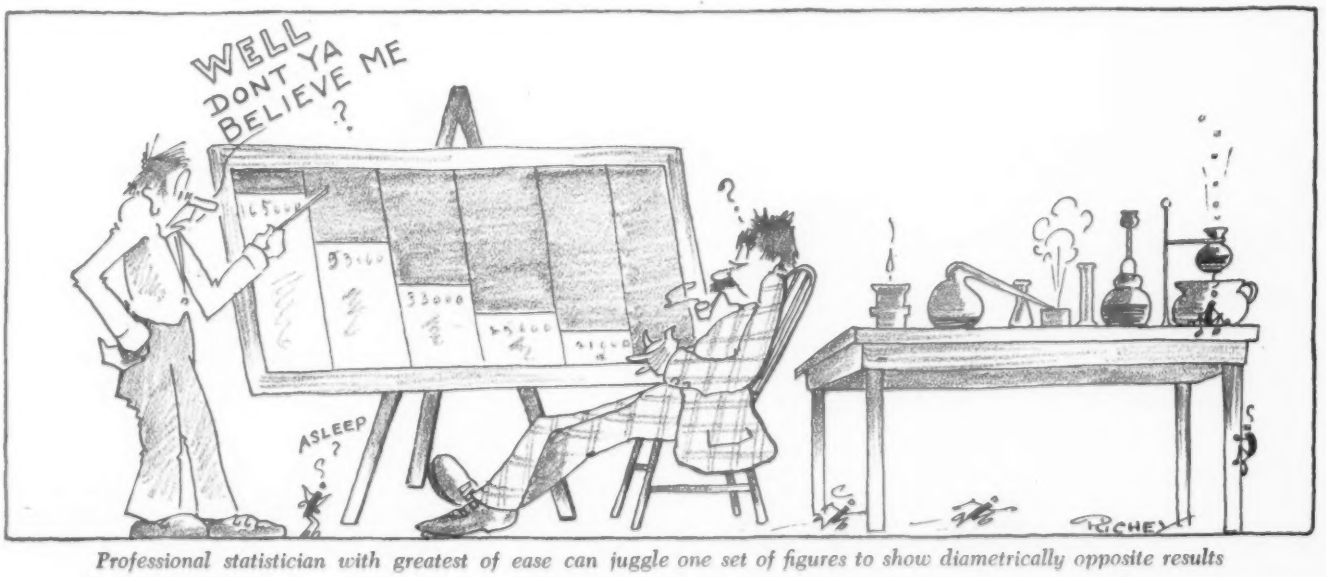
"4—See No. 2.

"5—As a manufacturer, he will get the priority ratings from the customers. They have to show what they are going to do with the castings.

"6—Under certain conditions and for some lines of castings permanent molds are used quite satisfactorily in many gray iron and aluminum foundries. So far as we know, only one malleable foundry has tried them out and then gave them up. They are entirely out of the question in the foundry he has in mind, casting 10 to 15 tons per week. Suitable permanent mold equipment would cost so much that—allowing for the difference in cost of operation as compared with sand molds—he would not break even in any reasonable period. Also it is extremely improbable that he could get any permanent mold equipment at present.

"No person likes to have cold water thrown on a pet scheme, but I pointed out that he had asked for advice and there he had mine. I had no personal interest in the subject, but since I had the rudiments of a streak of honesty in my makeup I hated to see a man innocently stepping into a place where he was sure to lose his shirt—and probably his pants.

"'Tis a tough old world," he sighed. "Some days a man can't put away even a dime."



Professional statistician with greatest of ease can juggle one set of figures to show diametrically opposite results

OBITUARY

DONALD J. CAMPBELL, 66, president, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich, died Oct. 11 in Spring Lake, Mich. He was born at Carlington Place, Ont., and after a grammar school education began his foundry career in 1890 as an apprentice

DONALD J. CAMPBELL

in the Bridge-end Foundry, Rock Falls, Ill. He also served in the Charter Gas Engine Works, Sterling, Ill., and with the Gates Iron Works, Chicago. Becoming a journeyman molder in 1897 Mr. Campbell worked at various foundries in the central and eastern states until 1902 when he joined Ferguson & Lang Foundries, Chicago, as general foundry foreman. Later he held the same position with Gates Iron Works and Bucyrus Iron Works, South Milwaukee. In 1907 he became connected with Olds Motor Works, Lansing, Mich., and left there in 1908 to join with George W. Cannon and Ira A. Wyant in forming the Campbell, Wyant & Cannon company.

Mr. Campbell was a noted inventor, having some 140 patents to his credit, and was a member of the American Foundrymen's Association and the National Founders' Association. He also was president of Campbell, Wyant & Cannon Engineering Co., and Campbell, Wyant & Cannon Crankshaft Co., both of Muskegon, and of the Ordnance Steel Foundry Co., Bettendorf, Iowa.

Mr. Campbell was awarded the McFadden gold medal by the A.F.A. in 1939, and was a member of the Pioneers of America. Burial was at Rose Hill, Chicago, on Oct. 16.

• • •

Frank S. Russell, 65, chairman of General Refractories, Ltd., Sheffield, England, died recently at Cheltenham after a prolonged illness. Mr. Russell was a man of great organizing ability and to his efforts are due the creation of most of the trade and technical activities in the refractory industry. He attached great importance to the meetings of technical associations and was an enthusiastic attendant at international and overseas conventions of the Iron and Steel Institute, the Institute of British Foundrymen or meetings connected with the refractory industry. He was one of the chief moving spirits in the LANCASTRIA group of British and continental European foundrymen who attended the first American International Congress, Detroit, in 1926.

• • •

Oscar C. Olson, 52, sales representative, S. Obermayer Co., Chicago, died Sept. 23 in that city following an illness of several months. He had been associated with the company 37 years and was active in the Chicago chapter, American Foundrymen's Association.

• • •

George T. Ladd, 72, president and general manager since 1928 of United Engineering & Foundry Co., Pittsburgh, died in that city Oct. 3. He was also president of the Ladd Equipment Co. and chairman of the Pittsburgh Testing Laboratory, both of Pittsburgh, chairman of the Woodrings-Verona Tool Works, Verona, Pa., and was identified with numerous other companies.

• • •

William F. Meredith, 72, president of Titanium Alloy Mfg. Co., New York, died in Princeton, N. J., Sept. 28. He organized the Titanium company in 1906.

• • •

William J. Donnelly, 60, former treasurer of the George A. Smith Casting Co., Milwaukee, now the Smith Steel Division of Grede Foundries Inc., died in Milwaukee, Sept. 11. Mr. Donnelly retired in 1941 after 43 years with the company.

• • •

Fred G. Bennett, 58, personnel director of Buckeye Steel Castings Co., Columbus, O., died unexpectedly in that city, Sept. 13. He had been associated with the company for 40 years. A vice president of the Columbus Chamber of Commerce, Mr. Bennett also had been active in civic affairs of the city for many years.

• • •

A. M. Nelson, vice president and general manager, Crane Enamelware Co., Chattanooga, Tenn., died at his home recently. Mr. Nelson spent his entire business career with the Crane organization and had been connected with that company for 43 years. In 1922 he went to Chattanooga and built the enamelware division of that organization.

• • •

Frank Fleckenstein Sr., 52, former owner of the Louisville Brass & Foundry Co., Louisville, Ky., died at his home in that city, Sept. 26.

• • •

Edward Kelly, 40, part owner, Chicago Brass Works, Chicago, died Oct. 9 in that city. He was associated in the business with his father, James Kelly.

Book Review

The Technology of Magnesium and Its Alloys, by A. Beck, 512 pages, published by F. A. Hughes & Co. Ltd., London, England, price $10.

This volume is an English translation from the German by the technical staffs of the publisher and Magnesium Elektron Ltd., but is more than just a translation since the usual involved sentences of the original German have been changed to comparatively readable English. Also where the technical experience of the translators is at variance with the German text, footnotes are appended to clarify the situation.

The book is divided into 19 chapters covering practically all phases of magnesium and its alloys from production, application and handling to economic importance. The first chapter deals with raw materials and production while chapter II discusses physical properties of magnesium single crystals and their importance in the crystalline material. Chapter III relates to metallography of magnesium and its alloys. Physical properties is the subject of chapter IV, and mechanical properties are described in chapter V. Chapters VI and VII are concerned with the chemical behavior, corrosion and surface protection, and with melting and casting with special reference to sand casting. Technique of die casting and technique of pressure die casting are described in chapters VIII and IX. Chapters X, XI and XII deal with techniques for extrusion, forging and rolling.

Machining is discussed in chapter XIII, while principles of design, correct workshop practice and practical examples are included in chapter XIV. Magnesium as an alloying element is the subject of chapter XV, and its use in pyrotechnics and thermo-chemistry is described in chapter XVI. The remaining three chapters of the book deal with the economic importance of magnesium and its alloys, and a summary of patent specifications covering protection, fabrication and utilization of magnesium and its alloys.

Seeing the Plant

Pangborn Corp., Hagerstown, Md., recently has published a beautifully illustrated booklet entitled "To See Is To Understand." The illustrations take the reader on an interesting trip through the entire plant of the company, including the following departments: Design, pattern, foundry, structural metal, machine shop, assembly, painting, and shipping. The presentation also shows the plant surroundings, and illustrates the presenting the Army and Navy "E" to the men and women of Pangborn.

Charles M. Rollit, Charles M. Rollit & Co., Foshay Tower, Minneapolis, has been appointed representative in the state of Minnesota and the upper peninsula of Michigan by the Federal Foundry Supply Co., Cleveland.

The CORE OIL DOCTOR

Devoted to new ideas and case study reports on core room practice

A corner of our laboratory where oil analyses are compounded and finished cores tested. The facilities of this department are available without charge to Certified core oil users.

A Policy Which Has Stood the Test of Time

The providing of strictly uniform core oils, properly analyzed, at the lowest price consistent with quality.

Individual service, to assure each user of core oil the best possible results on the particular job for which it is intended.

Manufacturing and invoicing all core oil by weight, instead of by volume.

Back in 1929, when we began to manufacture Certified core oils, we inaugurated these policies which have not changed, despite the erratic economic conditions of the past fourteen years.

Also, Certified core oils proved their value during the years when foundry operations were at a low ebb by speeding up core production; reducing baking cycles, core breakage and cleaning costs, and in addition proving the most economical cost-per-ton-of-sand-mixed basis.

As foundry output increased, the use of Certified core oils grew at an even faster tempo until they have, and still are, being used in many of the largest and best known foundries in all parts of the country. To meet this demand, we were obliged to build a new 350,000 gallon plant to care for the requirements of our customers. A fact most gratifying to us is that superintendents who once try Certified core oils continue to use them.

Many of the products required in the production of castings had to be improved in order to meet today's exacting government specifications, but there was no need to change the analysis of Certified core oils, which have proved fully equal to their part in the making of armament castings; whether the metal be aluminum, magnesium, steel, semi-steel, grey iron, brass or bronze.

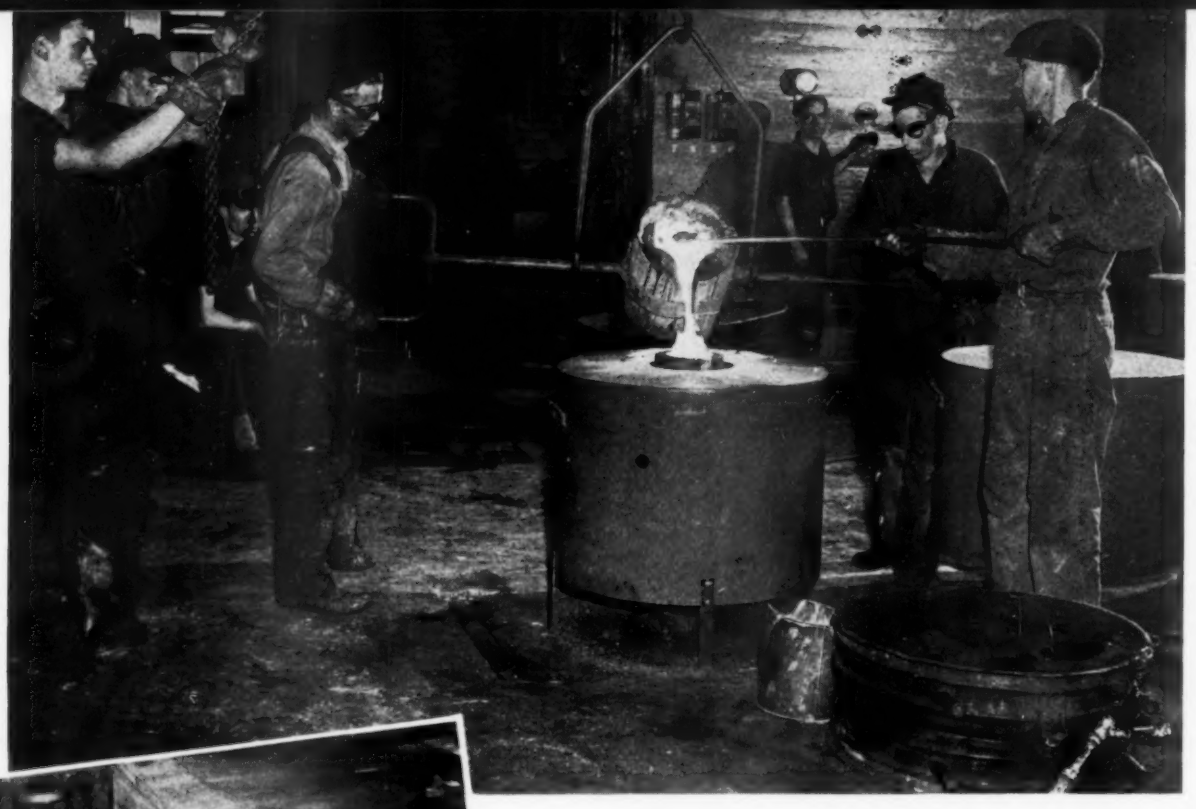
It will pay you to test Certified core oils. Write us fully, stating the core oil and sand used, the oil-to-sand ratio, what other binder is used — if any — the oven heat employed and a general description of the castings produced. Without obligation, the Core Oil Doctor will prescribe the core oil which will provide maximum efficiency at lowest cost in your foundry.

CERTIFIED CORE OIL & MFG. CO.

"The House of Dependability"

3308-26 South Cicero Avenue, Cicero, Illinois

Stock and Representatives: Buffalo, N. Y. Elmira, N. Y. Worcester, Mass. Reading, Pa. Newark, N. J.
St. Louis, Mo. New Orleans, La. Houston, Tex. Chattanooga, Tenn. Minneapolis, Minn. Portland, Ore.



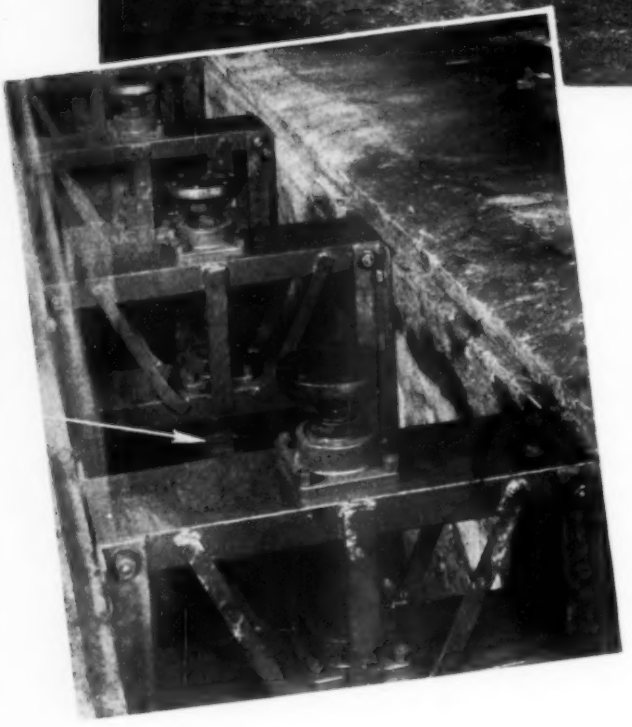


Fig. 1 (Above)—Pouring a mold in one of the centrifugal casting machines. Safety shield protects men against any splashes. Fig. 2 (Left)—Pit showing arrangement of machines. Power is generated by a small hydraulic motor at the bottom of the shaft

HYDRAULIC DRIVE Spins Steel Casting Machines

By EDWIN BREMER

AFTER careful consideration of advantages and limitations of the centrifugal casting process for production of steel castings, officials of the Youngstown Alloy Castings Corp., Youngstown, O., recently decided that certain types of castings regularly produced by that firm might be made more economically by centrifugal casting. Following that decision the next step was to secure or develop a machine for experimental work upon which commercial practice could be based. In studying the available information on centrifugal casting machines used in steel foundries, it was observed that in the main they were powered by electric motors through v-belt drives. To obtain variable speed of rotation of such machines a number of procedures are available, including changing the pulleys or using variable speed motors.

However, during the preliminary work involved in the preparation of a design for a machine which would possess the desired engineering features J. Trantin Jr., president of the Youngstown Alloy Casting Corp., conceived the idea that hydraulic power might be the solution to the drive problems. Thereupon, a hydraulic pump and drive were obtained, and work was begun in earnest to apply that principle to the operation of a centrifugal casting machine. After some time success attended those efforts particularly as to an arrangement whereby the speed could be varied over an extremely wide range.

At present the firm has 9 machines in operation incorporating that control mechanism. They start rotation smoothly and function similarly throughout the whole operating range which extends from 0 to 560 revolutions per minute. However, for convenience, and because the machines seldom are operated in the low speed ranges, the control is arranged to provide 12 speeds. Ordinarily in the practice developed by the firm the molten steel is poured into the molds revolving at approximately 100 revolutions per minute. As soon as they are filled the control is turned up to the full speed as determined by the size of the casting.

Some idea of the equipment and its arrangement may be gained from the accompanying illustrations. The installation for generation of hydraulic power is quite compact and consists of four 3-horsepower motors which drive twin

(*Concluded on page* 157)

HIGH STRENGTH

HIGH STRENGTH is just as necessary in the bentonite you use as in a bridge like the one shown above. You get high strength, both green and dry—consistently—in FEDERAL GREEN BOND. Careful pre-testing of deposits plus laboratory control of every processing step guarantees maximum high strength when you use . . .

FEDERAL GREEN BOND

Best of the Bentonites

Help to Hasten Victory—Buy War Bonds!

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • MINNEAPOLIS • NEW YORK • ST. LOUIS • RICHMOND, VA. • Mines UPTON, WYO.

Continuous TROUBLE-FREE OPERATION Assured by these Features of the "MASTER" Sand Rammer

THE cylinder of the new "MASTER" Rammer is Hard Chrome Plated and will retain its original standard dimensions two to three times longer than any unplated cylinder.

Because "MASTER" parts hold their standard size longer, loss of air is cut to the minimum, assuring sustained air power.

The "MASTER" Self-Seating Valve Box does not require repeated adjustment—the longer it runs the better it seats. It is so simple in design that repair costs are all but eliminated.

The operator does not have to sustain the weight of this perfectly balanced tool. He only guides it.

The design of the lower end effectively seals out sand, preventing scoring of the cylinder.

The handle is of simple construction, with an improved grip that is built for ease of operation and instant air control. The throttle tube will not clog and can be removed without difficulty.

DELIVERY FROM STOCK

Makers of "MASTER" Tools

MASTER TOOL COMPANY

5605 HERMAN AVENUE • CLEVELAND 2, OHIO

Rebuilders of all makes of Pneumatic Tools

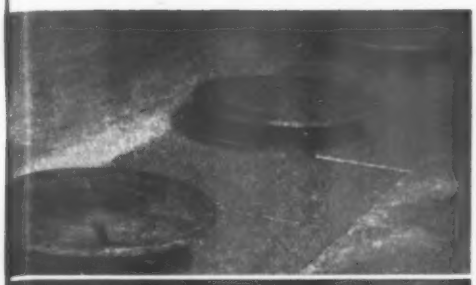


Fig. 3 (Top)—Steel plates cover machine pit. Fig. 4 (Above)—Hinged flasks are bolted to machine platens

(*Concluded from page* 154)

hydraulic pumps in tandem. In other words only one electric motor is required to operate two centrifugal machines. While that may seem a little unusual, it should be pointed out that the system works out quite successfully since the only time a high torque and consequently a heavy load are placed on the motor is when a machine is started. After a machine begins to spin, comparatively little power is required to keep it rotating.

The control panel is particularly noteworthy for its simplicity. Switch boxes on both sides of the panel are marked to indicate the machines to which power is supplied and eliminates any possible error. A gage indicates the pressure in the line which may reach 200 pounds per square inch for a minute or two in starting a machine, but drops to around 50 pounds under usual operating conditions. Speed control of each machine is by the small handwheels in the center of the panel. Those also are marked with the machine number, and the plates immediately under the wheels contain 12 numbered disks for that number of speeds. Pointers on the wheel stems permit operation of the machines at any predetermined speed.

Fig. 2 shows one of the pits in which 5 machines are installed. Construction of the machines is simple and rugged as may be observed. Cross members on which the bearings are mounted are made of heavy channel iron while the side supports are heavy angle irons. To insure stiffness between the cross members steel struts are welded in place. The hydraulic drive is located beneath the lower cross member as indicated by the arrow in Fig. 2. Tables or platens containing six slots are bolted to the upper ends of the shafts as shown in Fig. 3. Those are about 36 inches in diameter, and the slots are for accommodation of bolts for fastening the flasks or curbing in which the molds are placed.

As shown in Fig. 4 the flasks are steel plates bent to cylindrical form, and hinged on opposite points of the diameter so that they may be opened and closed rapidly for insertion and removal of the mold. The flasks are about 2 feet in diameter and 30 inches high. As a further protection steel shields are placed over the machines when in operation as shown in Fig. 1.

Molds for the castings are dry sand, and some of the castings made by Youngstown Alloy Castings Corp. are shown in Figs. 5, 6 and 7. The firm is just beginning commercial production of centrifugal castings and although most of its work has been confined to castings which are rotated around their own axes, some castings have been made which are arranged radially around a central sprue. In its brief experience the company has found that centrifugal casting has given a large increase in yield for certain castings. For example one type casting made in sand gave a yield of around 22 per cent while with centrifugal casting the yield was about 75 per cent. In another case the yield from sand casting was 25 per cent, and 89 per cent with centrifugal casting.

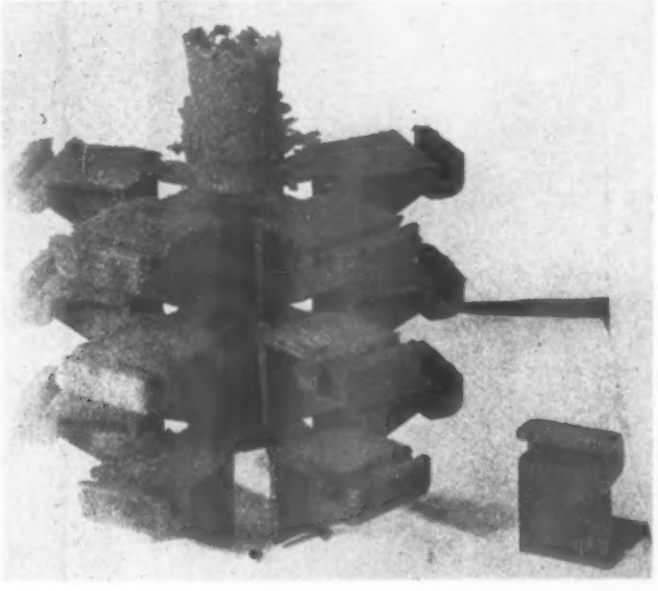


Fig. 5 (Left)—Cast steel brackets are made in a stack mold in which they are placed radially around a central sprue

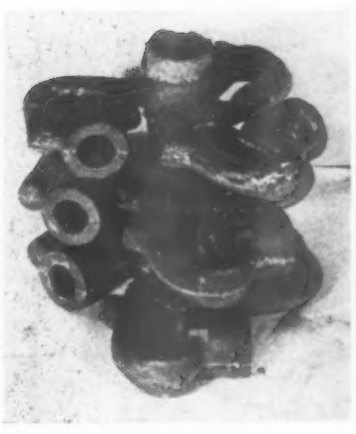


Fig. 6 (Left below)—Stack of cast steel handles for pneumatic hammers. Note how compact the arrangement is. Fig. 7 (Below)—A variety of rolls produced by centrifugal casting process

Savings To Be Effected in

CUPOLA MELTING

By JOHN LOWE
Battelle Memorial Institute, Columbus, O.

THERE surely is plenty of room for savings to be effected in a majority of our present day cupola operations. We should not only think of savings in terms of labor, equipment, and fuel, but also in terms of consistent and improved quality of cast iron.

A cupola melting unit should be designed so that it is easily manned, readily kept clean, and economically operated.

As to charging equipment, some people prefer hand charging, while others prefer different types of mechanical charging. Whichever type we use, we must be sure that our material is segregated, that the charges can be weighed easily and accurately, and that the charges are kept at proper height and are distributed evenly and uniformly at all times.

The use of a magnet yard crane to select and segregate the iron material charged and to deliver it to the scales, preferably a dial scale, is an important means of reducing labor costs. The drop-bottom bucket type of mechanical charging gives an even distribution of charge.

Coke should be handled in such a manner that it is accurately weighed with the minimum amount of breakage. This materially saves fuel.

Check Air Volume

Up to date blowing equipment should be housed in a clean room near the cupola so there is at least a 15-20 foot straight length of pipe between it and the cupolas. By having this arrangement, one is able accurately to check the volume of air being delivered to the cupolas. It is remarkable how well cupola blowing equipment has stood up in the past, since it has been used not only for blowing air but also for crushing cinders and limestone in spite of the fact that it was never intended to operate as pulverizing equipment.

It is very important to minimize blast pipe leaks, not only from the power consumption standpoint, but also from the point of view of accurate blast volume control.

Running slag on the floor is very wasteful of manpower, in addition to being disorderly. It is more economical to remove slag by mechanical means such as by using water to granulate the slag or by a slag buggy, depending upon the cupola location.

A room, conveniently located in respect to cupolas and pouring stations and properly equipped with mud mixer, raw material bins, ladle drying oven and ladle heaters, makes an economical setup for preparing cupola patch and ladle lining materials, as well as for lining delivery ladles, bull ladles, hand ladles, and mechanical pouring ladles more quickly. Savings can be effected on refractories by having a small brick crusher for crushing old fire brick and cupola block. If the slag is carefully knocked off before crushing, the crushed brick makes excellent material for daubing and ladle lining mixtures.

We cupola operators could learn a valuable lesson from the blast furnace, coke plant, and power plant operators, who depend on recording instruments to give them permanent, accurate, and unbiased data for checking and maintaining their operating standards.

It is essential that we have economical, mechanical means of delivering iron from cupola spout to and into the molds, such as monorails, overhead cranes, covered delivery ladles, mechanical pouring, and covered pouring ladles to minimize labor costs and to keep pouring temperatures in closer limits along with minimizing cold shots and missruns.

A rigid inspection should be made of all raw materials entering your plant, and chemical analysis made whenever there is a doubt as to the type and analysis of material. Constant watch should be kept on tramp materials in the charge, such as aluminum, brass, bronze, and tinplate. These materials

(*Concluded on page* 160)

From a paper presented at the annual meeting of the Gray Iron Founders' Society held in Cincinnati.

Foundryman Has Longest Ordnance Record

Associated with the Rock Island Arsenal since Sept. 12, 1892, *Herman E. Alex, foreman of the arsenal foundry and carpenter shop, has seen longer service than any other government ordnance plant worker. He is shown at the right being congratulated by Brig. Gen. Norman F. Ramsey, commandant of the Rock Island Arsenal, upon the completion of his* 51*st year with the arsenal. The foundry of which he has charge was established in* 1871, *and in all that time has had only two foremen—D. C. Thompson, who retired at* 79 *in the early part of the century, and Mr. Alex. The latter will be* 71 *on Nov.* 5. *Photo by Bawden Bros. Inc.*

Air Cooled Airplane Cylinder Head Cores

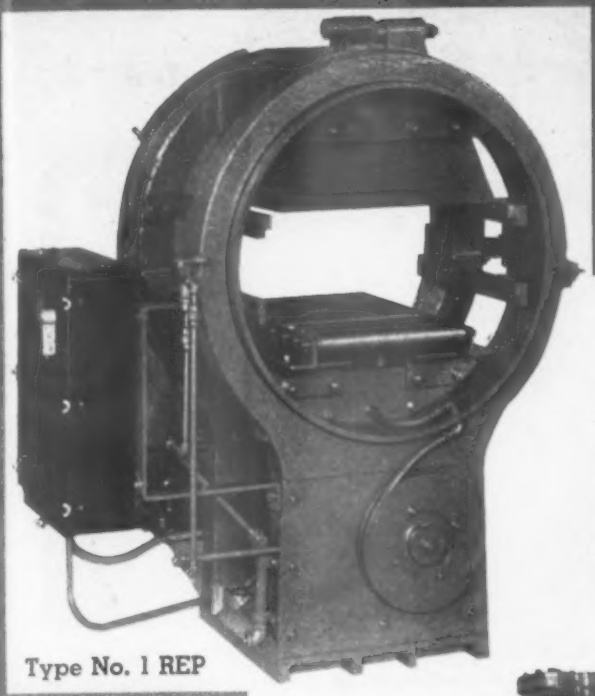
One of the War's Most Vital Foundry Jobs

ACCURACY demands are most exacting—
HIGH SPEED production is most essential

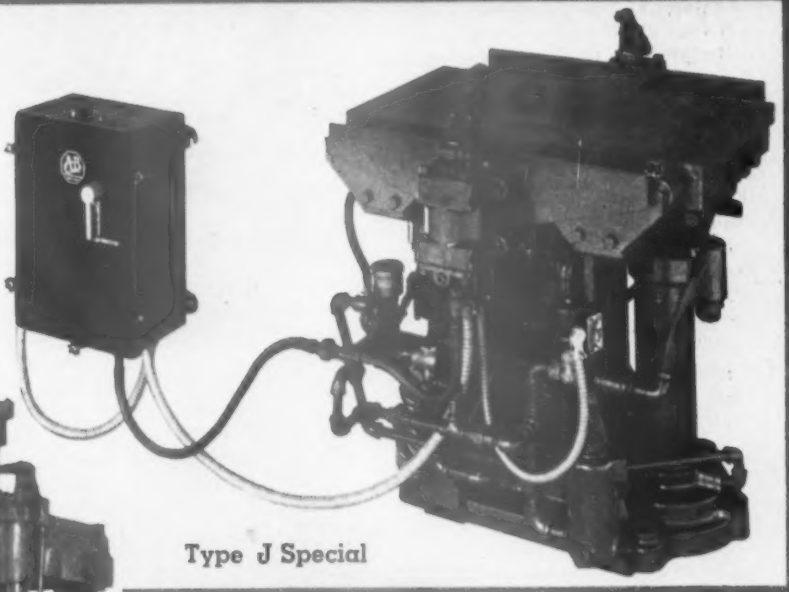
We have developed a series of

AUTOMATIC PUSH BUTTON CONTROL MACHINES

that produce these cores with miraculous precision and velocity



Type No. 1 REP



Type J Special

BUY WAR BONDS

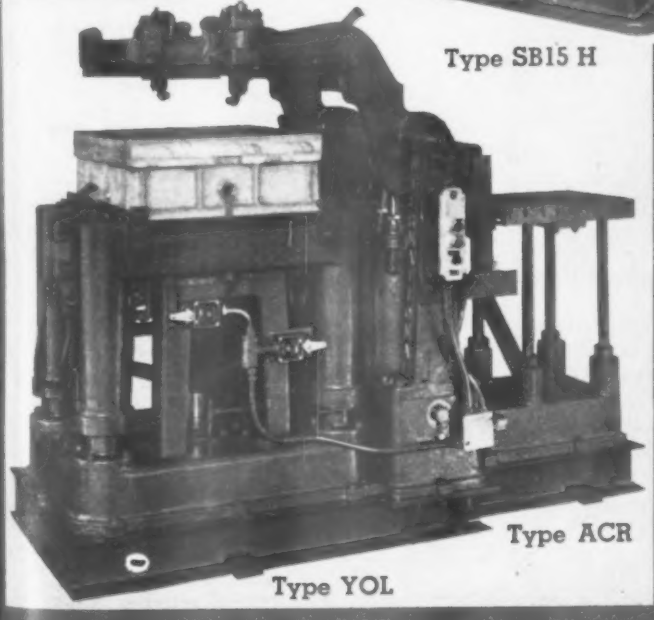
* * *

The World's Safest

INVESTMENT

Type SB15 H

Type No. 2 REP



Type ACR

Type YOL

A DETAILED DESCRIPTION OF THESE MACHINES AND THE CYCLE OF OPERATIONS WILL BE SENT ON REQUEST

* * *

INTERNATIONAL MOLDING MACHINE CO.

2608-2624 W. 16th St. • Chicago, Illinois

(*Concluded from page* 158)

should be kept out of the charges as they are all detrimental to the metal in one way or another. It is also good practice to be careful of alloy irons and alloy steel.

Cupola melting procedure requires competent supervision and personnel properly instructed to coordinate the operations and use of melting equipment and facilities economically and efficiently to produce quality iron consistently. It is essential to have a versatile crew. Men that can tap, line and charge.

It has been proven that a melting department incentive plan based on quality of iron, quantity of iron, and melting delays, very effectively encourages and maintains savings in melting operations.

Here is an excellent melting goal for foundry managers, metallurgists, and cupola personnel, which will materially aid in effecting savings in cupola operations: "Uniform and improved quality metal, metal on time, desired quantity of metal with economical, continuous, and courteous melting service."

Book Review

Essentials of Industrial Health, by C. O. Sappington, published by J. B. Lippincott Co., Philadelphia, for $6.50.

The war and the urgent need for maintaining peak production has turned greater attention to the problem of maintaining the health of industrial workers. Efforts of the men and women who have long been identified with the conservation of health of the industrial population must be greatly increased. At the same time industrialists and physicians who have given little thought to the subject of industrial health will be called upon to contribute considerably to the problem of keeping the industrial worker physically and mentally fit. One factor is the adequate protection of the limited manpower and womanpower enyaged in war production.

As the author points out, medical schools now are realizing the necessity for presenting the fundamentals of the rapidly increasing field of industrial medicine, and are placing more emphasis on the industrial health. This book is written to follow closely a recently proposed course for undergraduates. The author has attempted to show that industrial health goes beyond the ordinary practice of curative medicine and surgery in industry, running the gamut as it does from the historical foundations, centuries old in legislation and clinical development, down through the modern era of interest in economics and sociology; the development of industrial health specialties with particular emphasis on industrial hygiene and toxicology; the development of sanitation, etc.

Ferro Machine & Foundry Co. Awarded "E"

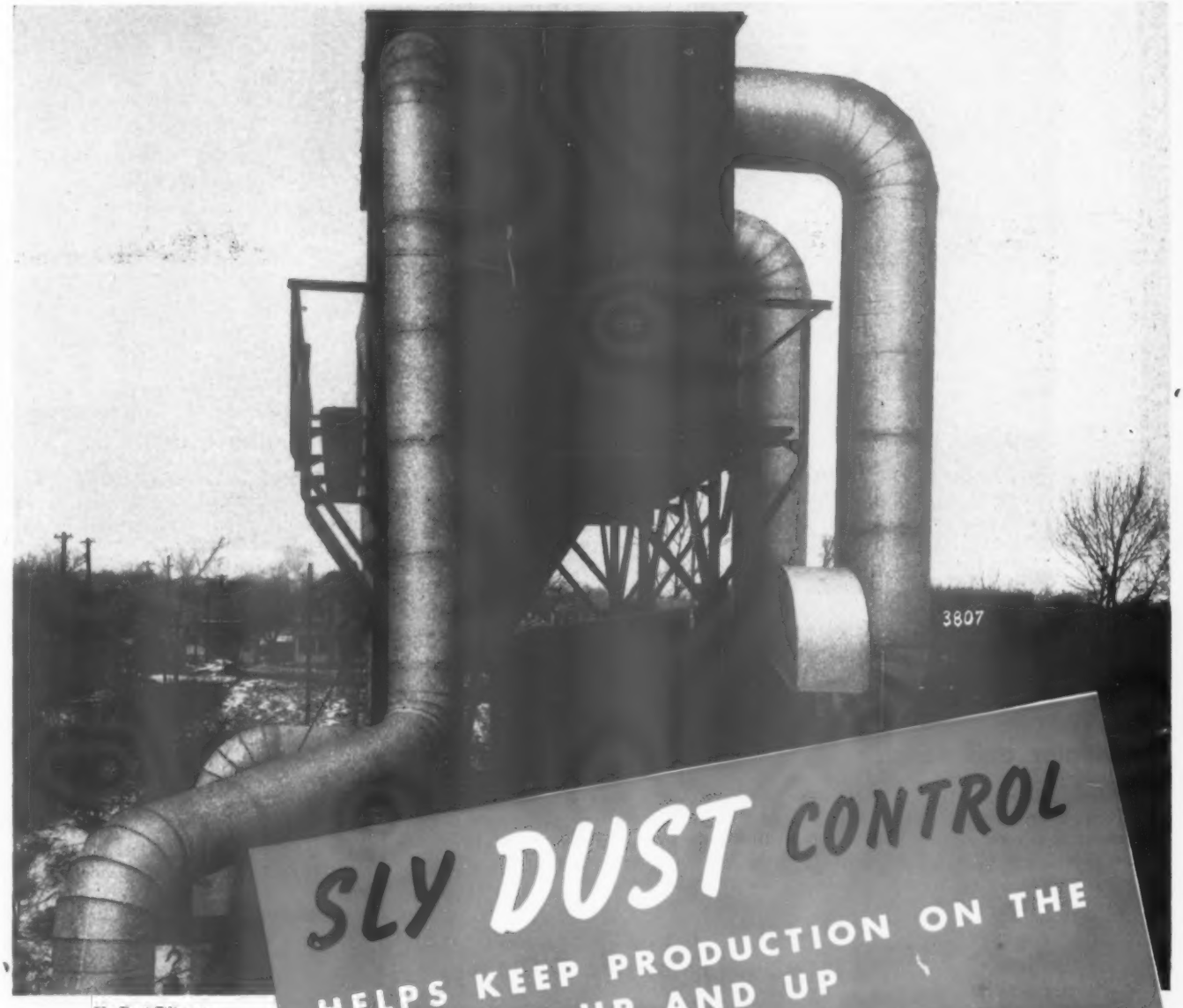
Ferro Machine & Foundry Co., Cleveland, formally was presented the Army-Navy "E" on Sept. 17 for "high achievement in producing materials needed for war." Mayor Frank J. Lausche of Cleveland was chairman of the award ceremonies during which the "E" pennant was presented by Col. H. M. Reedal, chief of Cleveland Ordnance District. John M. Price, president of Ferro Machine & Foundry Co., and John Schenk, representing the employes, received the flag. "E" pins were presented by Lieut. Comm. J. P. Sturges, Office of Inspector of Naval Materials, Cleveland, and Sgt. Alvin H. Roller, U. S. Army, with the acceptance speech given by Steve Alex, president of Local 1666, United Steelworkers of America

Hamilton Foundry Receives Army-Navy "E"

For its outstanding production of war materials the Hamilton Foundry & Machine Co., Hamilton, O., was awarded the Army-Navy "E" on Aug. 24, and at the formal but brief ceremonies on Sept. 23 Comm. G. H. Bowman, U. S. Navy (retired), inspector of naval material, Cincinnati, stated that the firm was the first gray iron foundry in history to receive the award. The pennant was presented by Rear Admiral Wat T. Cluverius, U. S. Navy (retired), Navy Board of Production Awards, Washington, to Peter E. Rentschler, president of the company. Illustration shows presentation of employe "E" pins by Col. Earl F. Baskey, Air Corps, Columbus, O., to John Nickel, Nicholas Minelli, George Feyh and Mary Weiss

Transfer Workers to Heavy Industries

The Cleveland regional office of the War Manpowerr Commission has announced that agreements have been worked out for the transfer of a number of sugar beet workers in Ohio and Michigan fields to foundries and heavy industries during the winter months. These workers originally came from Texas in the spring and planned to return to their homes there at the close of the sugar beet season. Under the terms of the agreements, the United States Employment Service is the only agency through which these workers will be referred to jobs.



Sly Dust Filter on roof of a foundry

SLY DUST CONTROL

HELPS KEEP PRODUCTION ON THE UP AND UP

THIS installation for a large jobbing foundry has a 14-foot filter divided into two sections: One section, 6′ long, exhausts a 10′ x 10′ blast room; the other section, 8′ long, exhausts tumbling mills and grinders.

These filters help make a cleaner plant, save maintenance costs, protect health and safety of employees. They provide definite and exclusive advantages:

1. **Greater filtering capacity because of more filtering cloth**
2. **Taut bags (patented) save power and improve dust removal**
3. **Bags more easily replaced**
4. **Automatic control (any degree) minimizes or entirely removes the human factor**
5. **Simpler shaker mechanism results in savings in maintenance and operation**

Sly Dust Control, with all its advantages, is not expensive. Tell us about your dust problem so that we may write you fully. Ask for Bulletin 98.

THE W. W. SLY MFG. CO.

4753 Train Avenue **Cleveland, Ohio**

TUMBLING MILLS **SLY** **BLAST CLEANING EQUIPMENT**

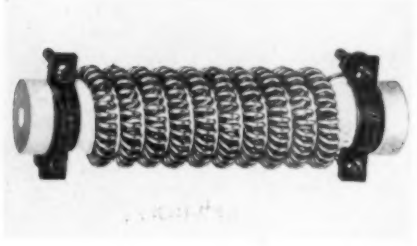
INDUSTRIAL DUST CONTROL

Dermatitis Cream

Prack Laboratories, 132 West Twenty-first Street, New York, has developed a fat-base cream for protection against dermatitis. It is claimed that the cream maintains its protective properties for many hours without drying, roughening or chapping the skin. Also the cream can be removed easily with water only. The cream is said to disappear into the skin without leaving any slipperiness or affecting the sense of touch.

Heater and Resistor

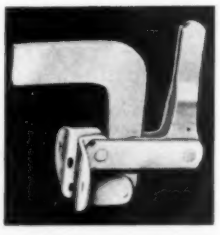
Techtmann Industries Inc., 828 North Broadway, Milwaukee 2, announces development of a new radiant heater and resistor consisting of a helical coil of nickel chromium wire wound spirally



around the refractory core. The core is said not to deteriorate at temperatures up to 1700 degrees Fahr. Binding posts and straps are made of monel metal or nickel chrome, depending upon the user's specifications. Designed for use in annealing ovens, electric furnaces and wherever high temperature radiant heat is required, the unit also serves as a resistor. It is obtainable in a range from 32 volts to 220 volts.

Core, Mold Box Clamp

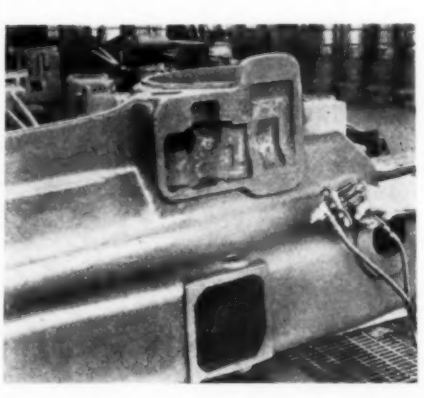
Knu-Vise Inc., 2200 Eighth Street, Detroit 1, has added a new toggle clamp to its line of clamping devices for application on core and mold boxes. The clamp shown in the accompanying illustration is designed to be fastened permanently to the box or flask. One is used on each corner, and when not in use the clamp drops down out of the



way so that it does not interfere with use of a strike for removing excess sand. In use the arm is raised up so it rests on the bottom board or core plate, and the lever pushed which holds it firmly in place.

Finish for Castings

Sherwin-Williams Co., Cleveland, has developed a new "pebble" finish for application to the surfaces of machine tool castings which is said not only to use far less finishing materials but to be applied in one-third to one-half less time. It provides a finished surface without use of fillers, sanding and numerous coats of sealing paint but effectively hides



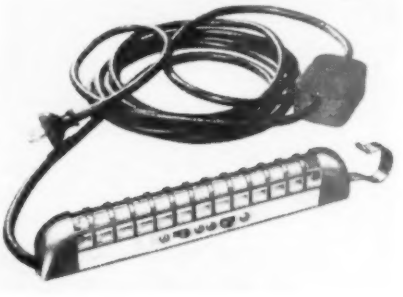
scratches resulting from the grinding of castings and other surface imperfections.

Lathe Cross-Slide

General Die-Stamping-Tool Co., 265 Canal street, New York 13, has developed a new lever-type cross-slide for use on small lathes. Ruggedly constructed for even operation and freedom from lift, its capacity is 2½ inches. Handle is adjustable in three positions. The two tool posts accommodate bits from ¼-inch to ⅞-inch and are equipped with a device that maintains the tool in horizontal position. Available in three models the unit can be made to fit most bench lathes.

Extension Light

Sylvania Electric Products Inc., 500 Fifth Avenue, New York 18, has redesigned its fluorescent extension cord unit. The new design permits fast lamp changes; ends have been rounded; a rig-



id hanging hook is riveted to the end cap; the white reflector provides maximum efficiency light output. The unit utilizes a 6-watt fluorescent lamp, has an overall length of 10¼ inches and weighs 2½ pounds. It is equipped with 12 feet of cord.

Payroll Calculator

Berger-Brickner Co., 433 South Spring Street, Los Angeles 13, is offering a new payroll calculator for figuring overtime as well as straight time. Forty hours plus overtime are calculated in one operation on one side of the device for firms requiring total pay check only. The re-

(*Continued on page* 164)

MAGNESIUM and ALUMINUM CASTINGS demand these 5 features of the modern

1 UNIFORM TEMPERATURES: Large quantities of circulated air insure uniform distribution of heat at low temperature differences.

2 AIR DISTRIBUTION: Use of special nozzles increases air flow and turbulence, prevents stratification and insures uniformity throughout full oven.

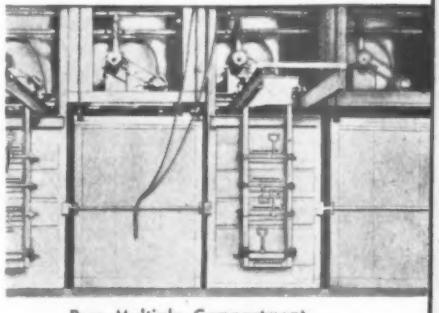
3 MAXIMUM CAPACITY: Temperature limits are small enough for proper baking of all sizes of cores on every shelf.

4 CONTROLLED TEMPERATURE CURVE IN OVEN: Temperature is controlled in zones in conveyor ovens.

5 PANEL CONSTRUCTION: Insulated Steel Panels provide the advantages of—minimum through metal, quick assembly and minimum heat loss.

ROSS CORE OVENS

Continuous Core Drying Oven for Sprayed Cores.



Ross Multiple Compartment Stationary Oven

SOME ROSS CORE AND HEAT TREAT OVEN INSTALLATIONS

Aluminum Company of America
American Locomotive Company
Bohn Aluminum & Brass Co.
Chevrolet Motor Co.
Chrysler Corporation
National Aluminum Cylinder Head Co.
Pratt & Whitney Aircraft Corp.
Packard Motor Company
Reynolds Metals Company
Sperry Gyroscope Company, Inc.
Tube Turns, Inc.
Westinghouse Electrical & Manufacturing Co.
Wright Aeronautical Corporation
and others

STATIONARY CONTINUOUS CONVEYOR

The shift from iron to the new light weight metals has brought new problems in core baking. Radical differences in properties of the light metals require more exacting control and present new problems in the preparation of the cores. ROSS Core Ovens have solved these problems through their ability to insure utmost uniformity and control of temperatures and air distribution. Their design embodies 25 years experience in the handling and control of air for processing.

Our engineering department will gladly supply full details on request. Write us.

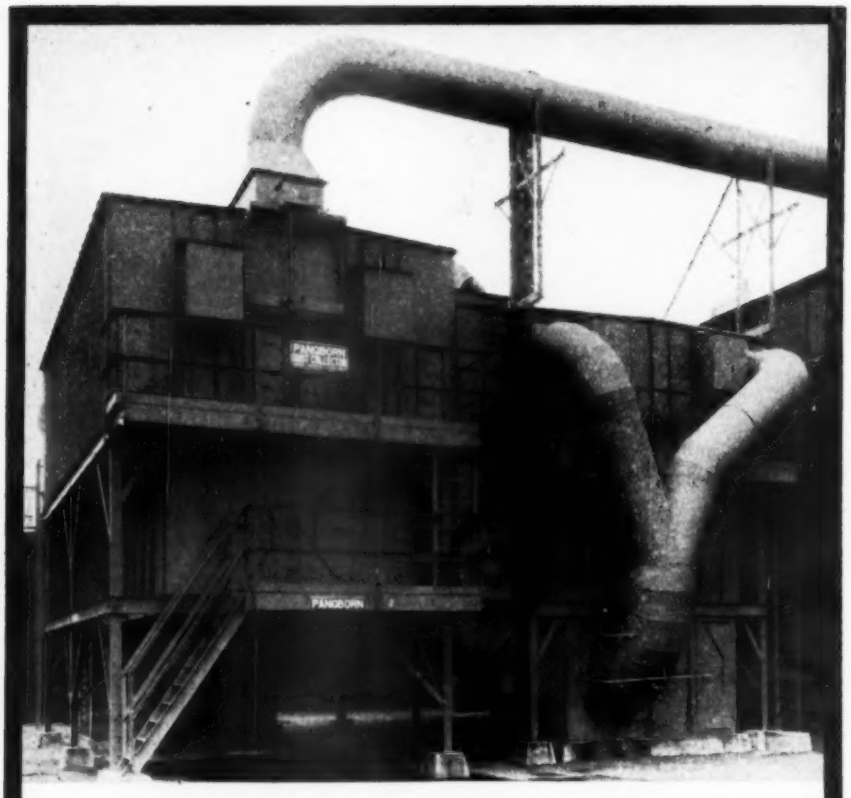
ROSS SYSTEMS

J.O.ROSS ENGINEERING CORP.

350 MADISON AVE., New York, N. Y.

CHICAGO • DETROIT • MONTREAL

CONTROL OF AIR FOR MODERN INDUSTRY



TWIN SPECIAL
DUST
COLLECTORS

● If you are pressed for room—yet need more dust protection in your plant—Pangborn Dust Control Engineers are prepared to give you recommendations that will take advantage of unused or waste plant space. Like the imposing installation above—your system will be satisfactory from every point of view—engineering, erection, operation and maintenance.

"COME TO PANGBORN"

ARMY E NAVY

PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION · HAGERSTOWN, MD.

(*Continued from page* 162)

verse side is used for figuring straight time and overtime as separate items. All hourly rates of pay from 40 cents to $1.74 with a half cent spread between rates, and time periods up to 80 hours with divisions of tenths and quarters of an hour, are covered by the calculator.

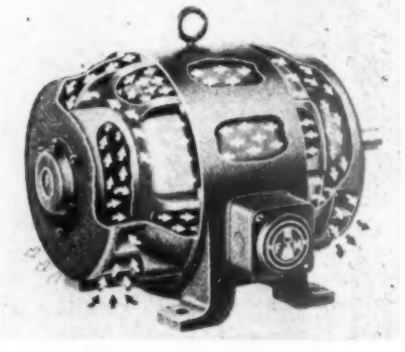
Helmet Air Regulator

Jas. A. Murphy & Co., Hamilton, O., is offering a separator for delivering clean dry air at any desired pressure to the wearer of a sand helmet. When the

air enters the separator it is subjected to sharp expansion and, if not above normal temperature, practically all of the water and entrained oil is precipitated. Condensate descends to the lower chamber and cannot be absorbed again by the air. The chamber is large enough for a day's run, and may be operated continuously by allowing a slight leak at the needle valve. For further purification, the air must pass through a thick filtering basket of noncorrosive tangle, where it is scrubbed of impurities.

Electric Motor

Fairbanks, Morse & Co., 600 South Michigan avenue, Chicago, announces a new type, all-purpose, continuous-

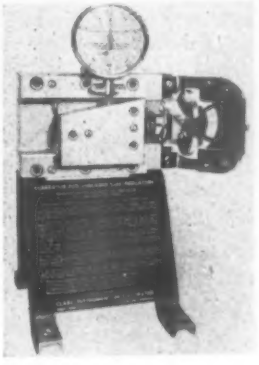


duty, polyphase squirrel-cage induction motor. It is fully protected against flying chips, falling particles, dripping liquids, etc. Ball bearings are sealed in cartridge-type housings. Cross-flow ven-

tilation, shown in the illustration, is a feature on certain sizes and is obtained through protected inlets and exhausts at each end of the motor. The frame is cast in one piece with rib sections to give added strength without increase in weight. Rotor bars and end rings are centrifugally-cast copper. When space is limited the conduit can be brought up between the motor feet to the tapped hole in the motor frame and the box cover assembled flush with the frame, the external box being discarded.

Indicator Tester

Clark Instrument Inc., 10200 Ford road, Dearborn, Mich., is introducing a new device for checking the accuracy of dial indicators. It employs the sine



bar principle, checking against the tangent of the angle. It is said to be suitable for receiving and periodic inspection both of the standard direct reading indicator and the reversed reading indicator used on Rockwell testers.

Evaporative Condenser

Drayer & Hanson, 738 East Pico Street, Los Angeles 21, is offering evaporative condensers with built-in air filters to protect against impurities in the cooling system. The units effect heat transfer through water evaporation in a continuous airstream, and are adaptable to a wide variety of industrial applications such as cooling batch quenching fluids, cooling oil for large diesels, cooling jacket water, etc. Proper filtering of air in the evaporator is claimed to eliminate or reduce greatly upkeep prob'ems such as clogging of lines due to impurities in the system, plugged spray nozz'es, excessive head pressures and pump maintenance. Capacities range from 5 to 100 tons. Filter is metal and rustproof, and construction is such that it may be removed and cleaned easily.

Heller Bros. Co., Newark, N. J., manufacturer of files, rasps, tools and steel, has acquired the goodwill, trade names and patents of the Cleveland File Co., Cleveland. John E. Nicklis, formerly associated in an executive capacity with the Cleveland company, is now with Heller.

Why SCHRAMM COMPRESSORS are Water Cooled!

The basic system of any cooling system is simply to remove heat of piston travel and reciprocating parts from the surrounding metal as quickly as possible by the cooling medium. Heat travels from metal to water 200 times faster than from metal to air. By using water to carry heat away and by providing water jackets which completely surround compressor cylinders and heads, SCHRAMM achieves the following outstanding advantages:

...assured uniformity in cooling.

...elimination of unequal expansion and contraction which might cause distortion.

...absolute control of operating temperatures to the desired degree.

...longer life to compressor parts.

...higher efficiency of compressive cycle.

...higher compressor capacity at lower power cost.

...greater capacity in smaller overall space requirements.

...ability to provide compressed air efficiently under any and all temperature conditions.

...ability to provide compressed "air where it's needed," regardless of the amount of water available for cooling. SCHRAMM compressors are built in types equipped for re-cooling water (as well as for running water).

Get all the facts . . . NOW!

Write at once for complete details. Send for Catalog No. 42-5.

SCHRAMM, INC., WEST CHESTER, PA.

THE COMPRESSOR PEOPLE

SCHRAMM Air Compressors

Standard Conveyor Engineers Have the Engineering Skill and Manufacturing Facilities to Build For a Variety of Needs

One of the largest and most notable pneumatic tube systems ever built — serving 27 departments at Bell Aircraft with swift transmission of important papers — is an outstanding example of Standard Conveyor engineering and manufacturing ability.

A complete roller conveyor system for the handling of heavy sheet-steel coils, weighing several tons each, in a large eastern mill is another noteworthy Standard Conveyor installation.

These highly diverse examples are indicative of Standard Conveyor engineering versatility and manufacturing skill. An experience record of more than 35 years, serving all classes of industry and business, qualifies Standard Conveyor to be of service to your company — on any conveyor requirement, large or small, for immediate or future handling needs.

Write for valuable reference book—"Conveyors by Standard" — Catalog No. F - 11.

STANDARD CONVEYOR COMPANY
General Offices:
NORTH ST. PAUL, MINNESOTA
Sales and Service in All Principal Cities

★ ENGINEERED FOR FASTER PRODUCTION ★

MODERN METHODS IN CASTING MAGNESIUM

(*Continued from page* 111)

craft motors are to be manufactured. These large aircraft molds have a number of cores, some small and some large, and in addition to the space needed for the actual manufacturing of the cores, considerable space also is needed for core cleaning and core assembling.

The large cores will be made on jolt rollover machines, which will require considerable space, and adequate room for the operator should be provided. Many of the smaller cores will probably be made on core blower machines, and as the production of these machines is large, facilities must be provided for the quick removal of the completed cores. If the quantities permit, conveyors should be used, and adequate material handling equipment should be installed for the carrying of cores into the molding department. This type of equipment tends to lower labor cost and increase production.

Brought Many Problems

Development of magnesium castings to their present stage of perfection has brought many new problems in the choice of molding sands. Years ago, when magnesium first was being cast in sand, not too much emphasis was placed on the type of molding sand used, and consequently foundry rejects were high, due to defects like burns and blows. Today, we are confronted with much more rigid inspection requirements of magnesium castings. These have been brought about by the much wider application of magnesium to aircraft, with the introduction of Army and Navy specifications, and also by the almost universal use of x-ray control of aircraft castings. This has led to increased knowledge concerning types and treatments of sands.

The principal types of magnesium alloys used in the United States are Dowmetal "C" and Dowmetal "H". The variation in these alloys is in the zinc and aluminum content, but the sand problems of each are identical. To be used in magnesium castings, a sand must have the following qualities:

1. High permeability. The chief reasons for this quality being: (a) That magnesium alloys are so light the sand must be open enough so that there is no back pressure from the air in the mold, when the metal flows into the mold cavities; (b) The open sand is repoint where the metal is poured can be filled quickly to prevent oxide skins being washed down into the casting. The proper placing of risers and the proper gating will go a long way in securing tight, sound castings.

On heavy sections that cannot be treated with risers, chills are used to equalize the freezing of the heavy and

light sections. These chills can be either cast iron or bronze, as neither cast iron nor bronze will enter into solution with the molten magnesium. Both iron and bronze chills have their advantages. Bronze has a high heat transfer, which makes its use efficient and desirable, but this type of chill occasionally can lead to contamination of metal if by chance, a rejected casting is thrown back into the melting pot without all of the bronze chills having been removed. In melting scrap or rejected castings, extreme care must be taken so that this does not occur. Cast iron chills have an advantage in the foundry where the sand is automatically conveyed back to the sand reclamation unit, and the chills can be removed from the molding sand by means of a magnetic separator. Cast iron chills are less expensive than bronze chills, and of course, in times like these when bronze is a critical material, it is advisable not to use this material for chills, if it is at all possible to use a substitute.

Before chills are used, they should be thoroughly cleaned and heated. They should be sandblasted and coated with some type of material which will act to prevent condensation of moisture on the chill. One method is a solution of talc in alcohol with about one ounce of resin per gallon. Another is a solution of carbon tetrachloride with paraffin and talc. This mixture is sprayed on the section of the chill that is to be exposed to the metal, and then the section is dried with a torch. This operation should be done under adequate ventilation as phosgene gasses are released during the spraying of the chills.

Provide Adequate Space

In the molding department, adequate space must be provided for bench molding and machine molding, whether small squeeze machines or the large type of jolt rollover machines are used. With reference to the large jolt rollover machines, it should not be forgotten that the operators need room and should not be cramped in their working space on these large molds. Provision should be made for side floor molding, that is for castings which are too large to go on benches or small squeeze machines but which will be made in quantities too small for putting on the large machines. Core storage, flask and bottom board storage space should be provided, so that the molders are not eternally searching for them. Adequate material handling equipment should be provided in this department, such as overhead monorails, cranes, or other devices of labor-saving nature.

There is a difference of opinion in many magnesium foundries concerning the handling of the molds after they are made. Some foundries bring their molten metal to the molding floor for pouring. The modern mechanized foundry reverses this procedure, and by means of conveyors, both power and gravity, takes the finished molds to the pouring stations, and after the molds are poured the same conveyor takes them to the

Today's war of movement goes into even faster action as the 'round-the-clock allied air attacks soften up enemy-prepared positions, blast supply lines and wreck armament plants.

Here at Acme, we're also in action—24 hours a day. Every previous record in producing tools, patterns, and heat-treated aluminum castings has been broken. And new records have a very short life. For the faster we work, the more we help war production plants to deliver fighting tools on time.

An experienced staff of engineers is a vital part of the Acme organization. Why not let us see if we can help you eliminate any bottlenecks that may be lessening production in your plant?

ACME PATTERN & TOOL COMPANY, Inc.
DAYTON, OHIO

Heat-Treated Aluminum Castings—Patterns—Tools—Tool Designing—Production Processing

HAUSFELD
FURNACES

MAGNESIUM
MELTING

FOR WAR AND PEACE
HAUSFELD FURNACES
SUPPLY THE DEMAND
FOR BOTH LARGE
AND SMALL UNITS
FOR OIL AND GAS FUELS

ILLUSTRATION SHOWS
1700 LB. CAPACITY
FOUR BURNER GAS FIRED
MOTORIZED
NOSE TILTING FURNACE

STATIONARY SIZES
FROM 100 LBS. UP

FURNACES FOR
BRASS • ALUMINUM
AND ALL OTHER
NON-FERROUS
ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

shakeout station. By this method, production is expedited, using a minimum of floor space, as the finished molds do not have to be placed upon the floor to wait to be poured.

(*To be continued next month*)

FOUNDRY ACTIVITIES

MONROE Steel Castings Co., Monroe, Mich., has received its second recognition and award for meritorious war work, this being a new Army-Navy "E" pennant to which was added a second star. The company received its first flag on Jan. 21, and the second award marks a renewal of the original presentation.

* * *

Index of orders for new foundry equipment rose from 320.9 in July to 341.0 in August, according to the Foundry Equipment Manufacturers Association. This compares with 355.6 in June, 274.3 in May and 297.7 in April but was well below the 536.7 for August, 1942. Repair orders declined slightly in August to 553.9 from 577 in July, but the index for total sales was 390.4 in August, against 379.4 in July and 510.8 a year ago.

* * *

Utility Electric Steel Foundry, Los Angeles, is building a craneway and an additional building at its plant at 3335 East Slauson Avenue.

* * *

General Steel Castings Corp., Granite City, Ill., has been awarded another star to the Army-Navy "E" pennant it won several months ago. The citation is for continuous meritorious service in production.

* * *

Clearwater Foundry is the firm name under which John G. Humphreys, Donald M. Herrick, Carl O. Beck and J. G. Kesababian have published an intention to conduct business at 404 North Paramount Boulevard, Clearwater, Calif.

* * *

American Alloy Foundry, Baltimore, is moving from 243 Colvin street to larger quarters at 112 South Eden street. August F. Kroether and Harry M. Gunther are partners in the company.

* * *

Allen Foundry is the firm name under which C. Marion Allen has published an intention to conduct business at 4550 Cutter street, Los Angeles.

Abrasive Wheel Code Is Revised

American Standards Association, 29 West Thirty-ninth street, New York, has revised its "Abrasive Wheel Safety Code". New sections have been added, new rules have been included, and new specifications for drawn steel protection hoods for portable grinders have been made. Copies of the code are available for 35 cents.

ELECTRIC STEEL MAKING CONFERENCE

(*Continued from page* 118)

expense of power factor, it adds considerably to cost of operation.

Method of charging the furnaces varies according to equipment available, but top charging appears to be the most rapid. Method of charging has a considerable effect on melting time, hence care should be taken to get good distribution of the raw materials, placing the heaviest and densest material on the bottom, and the lightest at the top.

In a discussion of the high frequency electric induction furnace, mention was made of two special types of those furnaces designed for use under a vacuum, and under vacuum followed by application of pressure. In those the furnace and mold into which the metal is poured are enclosed in a chamber which can be evacuated or subjected to pressure. Induction furnaces up to 5-ton capacity have been constructed and placed in operation, but the trend appears to be to smaller units; using two crucibles with one inductor element. While one crucible is being charged, the charge in the other is being melted, and as soon as the latter is removed, it is replaced by the freshly charged crucible. In that way the metal is melted rapidly without long waits between charges.

Discuss Many Topics

The afternoon session on Oct. 1 was under the direction of Chairman A. L. Field, Rustless Iron & Steel Corp., and Co-chairman Henry D. Phillips, Lebanon Steel Foundry. Topics of discussion included refractories for electric melting furnaces, electrodes, scrap for electric melting furnaces, slag-making and oxidizing materials, and the present situation on steel making alloys.

At an evening meeting with Herbert W. Graham, Jones & Laughlin Steel Corp., as chairman, and Harry W. McQuaid as co-chairman, a motion picture entitled "The Manufacture of Electric Furnace Steel" was presented. In the absence of H. G. Batcheller, vice chairman, WPB, who was unable to be present, J. T. Whiting, director, Steel Division, WPB, presented an address on "Electric Furnace Steel and the War".

On Saturday Oct. 2, the conference was broken up into two groups; one discussing basic electric furnace steel which mainly was concerned with ingot production, and the other considering acid electric steel practice, more particularly as applied in the foundry field. The morning session on acid steel melting was presided over by R. H. Frank, Bonney-Floyd Co., Columbus, O., chairman, and G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind., co-chairman, and the topic of discussion was "Oxidizing Prac-

ALLOYS SIPI

COPPER SHOT

Immediate Delivery

Any quantity, any size and prompt delivery . . . of course, "with proper priority."

SILVERSTEIN AND PINSOF, INC.

1720 ELSTON AVENUE
CHICAGO (22), ILLINOIS

We Salute Our

FOUNDERS

• • •

We are proud of our record of over seventy-one years of faithful service through three major wars. We shall endeavor to maintain this record of service throughout the years, long after peace again is ours.

★

We Are Also Proud of Our

HOT FORGED
"KOOLHEAD"
FOUNDRY CHILL NAILS

Hot Forged "*Koolhead*" Foundry Chill Nails will not win this war but they are playing an important part—Hot Forged is your assurance of *uniform cooling* . . . . . they won't let you down—just ask the Foundry Foreman and nine times out of ten he will say,—"GET ME KOOLHEAD, THE KIND THAT STANDARD MAKES."

ESTABLISHED 1872 — STANDARD FORGED — INCORPORATED 1886

STANDARD
HORSE NAIL CORPORATION
NEW BRIGHTON, PA.

Manufacturers of HOT FORGED "KOOLHEAD" FOUNDRY CHILL NAILS AND HORSE NAILS—STEEL TAPER PINS—WOODRUFF KEYS—COTTER PINS—AND OTHER STEEL SPECIALTIES

tice". Opening remarks relating to a general review of oxidizing practice were made by Charles W. Briggs, and then various phases of the subject were covered by a number of speakers. Topics included charging for rapid melting, controlling power, minimum melting time, etc.

In charging for rapid melting it was pointed out that size, shape, quantity of scrap, and its placement in the furnace were important items. At present there is a trend to top charging as it appears to permit more rapid charging of the electric furnace. It was suggested that good procedure in charging to obtain best results is to place heavy, good-packing scrap on the bottom, followed by such material as twisted and irregular gates, etc. which do not pack well, then lighter scrap and finally punchings. Placement should be such that shifting of the charge is prevented as well as breakage of electrodes.

Use of two buckets for top charging was recommended; one to contain the heavy scrap, and the other the lighter scrap instead of trying to charge both from one bucket. The charge should not be too dense since that tends to slow down melting. Regularity of the type of charge is particularly important, and when possible it is advisable to establish a standard charge. Even in these days when types of scrap change rapidly, it is possible to look over the situation at the beginning of the week, and determine from the amounts and types of scrap available, suitable standard charges for that length of time.

Avoid Sulphur Increase

Reference was made to the use of oily turnings, and the possibility that increase of sulphur content in the finished steel may result from that cause. Suggestions on avoiding trouble from that source were to place them into the center of the charge where oxidizing conditions are more prevalent, and the sulphur would be absorbed by the iron oxide which has a greater affinity for it than has iron. Another procedure is to charge the turnings on the bottom so that the heat volatilizes and burns off the sulphur before it has any harmful effect.

In control of power for rapid melting it was mentioned that outside of power costs, the most important factor is the type and placement of scrap in the furnace as previously had been discussed. To obtain rapid melting it is necessary to get a pool of liquid metal under the electrodes as quickly as possbile, and to do that before the electrodes hit the bottom of the furnace. When the latter occurs a viscous slag may be formed, and considerable bottom trouble encountered. The charge should be arranged so that a pool of metal is formed rapidly, and the surrounding solid metal falls into and is dissolved in the pool. Sometimes it is advisable to bar or poke the charge so that the foregoing is accomplished. At all times practice should be such, through charging and highest possible power input, that rapid melting is secured.

To obtain the maximum recovery of oxidizable alloys from the slag the residual carbon should be maintained as high as possible and still meet the final specifications for that element. Also selection of raw materials should be such as to obtain uniformity in the heats. With heats that vary considerably in oxidizable alloys, too many changes have to be made in melting practice for maximum recovery. Boiling is essential to secure the best steel since it reduces the silicon in the bath, and consequently, the affinity of the bath for soluble gases. Also the carbon content is reduced, and the carbon monoxide formed during the boil acts as a carrier for hydrogen; removing it from the bath. In stopping the boil the consensus indicated adjustment of conditions so that it goes to completion with the residual carbon at 0.15 per cent, and then recarburize. Some favored blocking with ferrosilicon, but in those cases the boil was permitted to go almost to completion.

The afternoon session on Saturday, Oct. 2 dealt with refining and deoxidation of acid electric steel and with Fred A. Melmoth, Detroit Steel Castings Co., Detroit, as chairman, and Fred B. Riggan, Key Co., East St. Louis, Ill., as co-chairman. Clarence E. Sims, Battelle Memorial Institute, Columbus, O., gave a brief review of deoxidation practice and then as in the case of the previous session, the various phases were discussed by other speakers. Topics included standardization of refining and deoxidizing conditions, control of silicon reduction, refining slags and control, iron oxide content of slags and metal, deoxidation of calcium-silicon alloys, etc.

Study Slag Condition

Use of the slag viscosimeter was discussed. It was pointed out that the length of run in the instrument could be correlated to the chemical analysis so that it formed a valuable tool in determining slag conditions. In general, long runs indicated a fluid slag while a short run of say 4½ to 5 inches meant a somewhat viscous slag resulting in inclusions in the steel. Mention was made of the application of the graphic wattmeter to determine slag conditions. The instrument shows the fluctuation of power as the arc varied. As the slag is built up the arc variations become more uniform and steady, and likewise the power fluctuations as indicated by the wattmeter.

Viscosity of slag and its volume are important factors in refining acid steel, and both must be maintained at the most desirable point as determined by the particular practice. It was pointed out that usually a low volume of slag resulted in a low manganese loss while a high volume caused a high manganese loss. In a discussion of the iron oxide content of refining slag and metal it was mentioned that the mixing of slag with metal during tapping was the cause of variations in composition of the metal, and that the closer the equilibrium between iron oxide in bath and metal at the time of tapping, the less the variation. However, it was pointed out that obtaining such

● Making only Mounted Wheels and small Grinding Wheels—maintaining highest quality in spite of large quantities and rush orders—shipping them promptly—*This is our job, our battlefield.*

With full WPB approval, we stopped making all large size grinding wheels and fixed our sights on wheels *3″ in diameter and under.*

We worked all around the clock, 24 hours a day, and in a short time were able to fill orders on time—And, our central location cuts time in transit. Today, there is no waiting. With the Army-Navy E at our masthead, we are going full speed ahead.

Half a century of specialization has established our reputation as the Small Wheel People of the Abrasive Industry. You can bank on us.

TEST WHEEL FREE

To get acquainted with Chicago Wheels, let us send one postpaid. Tell us size wheel and material you wish to grind.

Write for illustrated catalog

CHICAGO WHEEL & MFG. CO.

1101 W. Monroe St. Dept. FD, Chicago 7, Ill.

FD-11

Send Catalog. Interested in:

☐ Mounted Wheels ☐ Grinding Wheels

☐ Send Test Wheel. Size _____

Name _____

Address _____

★

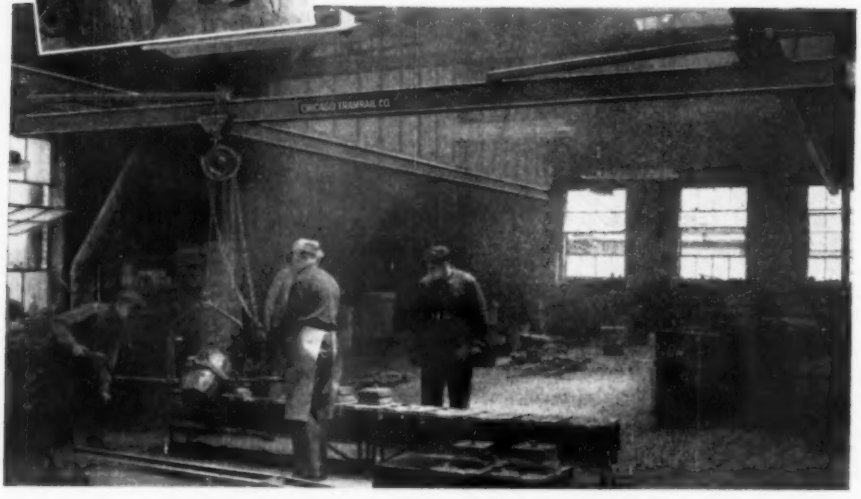
from furnace to pouring

VIA

CHICAGO TRAMRAIL

MONORAIL CRANES

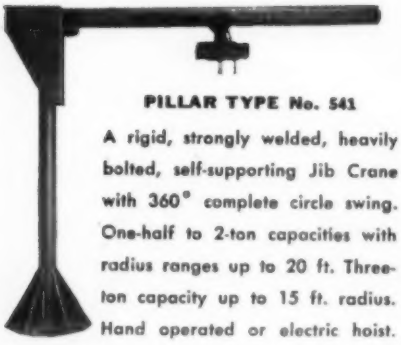
Faster . . . Safer



Photos courtesy Atlantic Brass Works—Chicago

★ View at top shows man pulling a crucible of molten brass, which will soon be whisked from the furnace to the floor by a small-size Chicago Tramrail Furnace Crane. The skimming operation done, the load is then switched to the larger overlapping Monorail Crane (bottom view) which spans all molding points for rapid distribution of the liquid metal. All flasks can be poured direct from this crane.

A low-cost installation of this type is but one of many hundreds that have been designed and "built-in" by Chicago Tramrail engineers for speedier and safer overall foundry operation.



PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

***and at the* "SHAKE-OUT" *use* JIB CRANES. Here's Why:**

These nimble Jib Cranes swing fully 360° to receive loads from all overhead cranes that converge at the shake-out.

And Jib Cranes are handling this operation with greater flexibility and speed, meanwhile releasing overhead cranes for other work. When ordering be sure to state lifting capacity, length of arm and distance from floor to arm. Illustrated circulars obtainable on request. Write

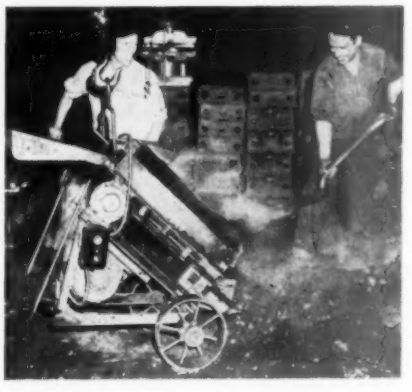
CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

equilibrium was difficult because addition of aluminum immediately changed the conditions. Trouble from interaction of slag, metal, and aluminum could be prevented by use of a taphole which permitted only metal to flow from the furnace into the ladle at the beginning of tapping and addition of aluminum.

Application of calcium-silicon followed by aluminum was said to give good results in deoxidation, and many favored the use of calcium-silicon-manganese instead of calcium-silicon. That procedure gave quite satisfactory results on ductility tests. However, mention was made that for certain types of castings, particularly those with extremely heavy sections and of molybdenum-manganese composition, the use of aluminum after calcium-silicon-manganese resulted in the formation of Type 2 inclusions of the stringy type, and accompanying low ductility values. However, elimination of the aluminum, and use only of calcium-silicon-manganese as the deoxidant, prevented the trouble.

Trade White Collars For Foundry Job



Joseph Tyler (left), a roofing contractor, and Bob Paddock, Sears Roebuck shipping clerk, are among the hundreds of professional and white collar workers who are employed on 4-hour shifts in Berkeley, Calif., war industries after putting in a full day at the office or store. Messrs. Tyler and Paddock are shown shoveling sand into a Royer sand conditioning machine at the plant of the H. C. Macaulay Foundry Corp., Berkeley. These men and a dozen others work at cleaning up the foundry at the close of the day's pouring. In Berkeley alone, some 1000 of these part-time workers are helping out in 25 of the city's plants. Photo courtesy San Francisco Daily News

Adds "M" Flag Star

Jenkins Bros., Bridgeport, Conn., has been awarded a second gold star to the U. S. Maritime Commission "M" pennant which was first presented to the company 6 months ago.

SNAGGING CASTINGS IN THE FOUNDRY

(*Continued from page* 120)

from a movable jib or from a trolley on an overhead track.

Another special type of snagging machine is used widely in stove foundries for snagging tops after they have been assembled. The castings are fed automatically under a series of grinding wheels which have a traverse motion across the tops. The first cut is for roughing and is done with coarse wheels. Finer wheels do the finishing, and the final polish is produced with polishing wheels impregnated with glue and abrasive.

To secure high production and low costs it is essential that snagging machines be kept in top notch condition. Vibration from such causes as loose spindle bearings, or out-of-balance in the revolving parts, results in intermittent contact between wheel and work so that the time the wheel is actually grinding is reduced and the rate of material removal suffers. Also, the repeated violent bumping of the wheel on the work is likely to crush the face of the wheel and shorten its life. It is commonplace for a wheel to show only half its proper rate of material removal and life when mounted on a poorly maintained machine.

Pressure Determines Action

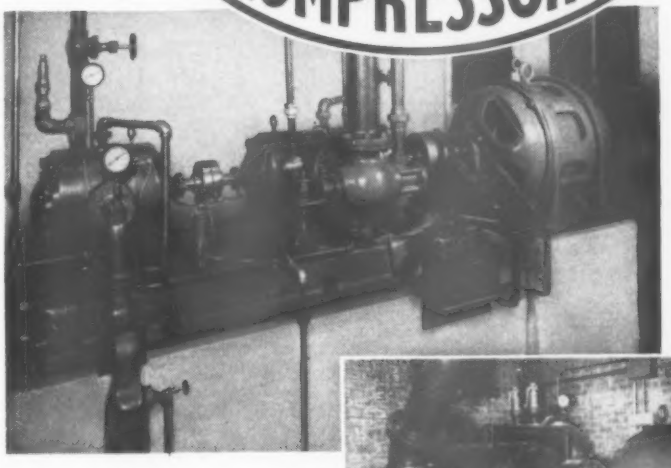
Since in snagging the operator controls the pressure between wheel and work, and the nature of the movement between them, it is important that he adapt his technique to the wheel he is using. The magnitude of the stresses set up by these factors determines how the wheel will act. If the stresses are high, the wheel will act soft, and vice versa.

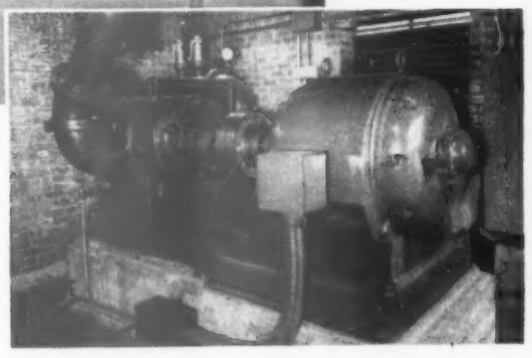
If economical grinding is to be achieved it is essential that the working pressure be balanced in relation to the grade of the wheel. To increase the pressure will increase the rate of material removal. To decrease the pressure will give greater wheel economy. It is important to remember these points.

To obtain the greatest efficiency, the operator should be given some training so that he can secure just the right balance between rate of cut and wheel life. If the operator observes the flow of sparks in relation to the pressure applied, and the relation of pressure to wheel wear, he will soon sense the most effective pressure to use to secure maximum material removal with reasonable wheel wear.

Experience will teach the operator that a grinding wheel will remove stock more economically if there is a continuous movement laterally of the wheel face across the work at low pressure, than if there is little or no such move-

ROTARY
FULLER
COMPRESSORS





BUILT FOR
TROUBLE-FREE OPERATION

Rush! Rush! Rush! More speed all along the line. That's the cry today. But speed is not enough . . . equipment must be able to stand up under the most severe operating conditions . . . service must not be interrupted. Breakdowns—delays—time out—all mean loss of vital production and money out of pocket.

With this thought uppermost, only the best of materials and workmanship go into the makeup of Fuller Rotaries. They're built for trouble-free operation and performance records prove them to be just that. When, after long, gruelling operating periods, inspection and check-up is desired, the machine design permits doing this quickly and easily.

FULLER Rotary Compressors are built for capacities to 1800 C.F.M. actual free-air delivery, 125-lb. pressure. Vacuum pumps for vacuums to 29.90-in. (referred to 30-in. barometer).

Write for Bulletin C-5, fully illustrating and describing Fuller Rotaries.

C-80
100

FULLER COMPANY
CATASAUQUA—PENNSYLVANIA
CHICAGO, 3 Marquette Bldg. WASHINGTON, 5, D.C. Colorado Bldg. SAN FRANCISCO, 4 Chancery Bldg.

All types of Industrial

CARS, TRUCKS & TURNTABLES

We give PROMPT ACTION to your specifications

CALL, WIRE OR WRITE TODAY

Ask us for Suggestions

on any car or truck problem . . . or send your specifications in any form, notes, drawings, etc.

INDUSTRIAL CAR BUILDERS FOR 40 YEARS

CHASE Foundry & Mfg. Co.
COLUMBUS, OHIO

ment but a high pressure. This is true because lack of movement permits large areas of contact to be built up between work and wheel. The faster and more continuous the movement, the less the area of contact built up. Long arcs of contact and wide areas of contact interfere with disposal of the chips and retard the cut.

For greatest production and least wear, a snagging wheel should operate at its correct speed — no higher. At slower than recommended speeds wheel life may be reduced as much as 40 per cent, without consequent lowering of the rate of cut. To avoid this it is essential that machines be watched to make certain that speeds are not being reduced by insufficient power, belt slippage, or the failure to change pulley speeds to compensate for wheel wear or when changing from a larger to a smaller wheel.

No matter which type of machine is used, vitrified bond wheels should never be operated at a speed higher than 6500 surface feet per minute. Hard or strong organic bond wheels may be operated at up to 9500 surface feet per minute but no higher.

Must Use Right Wheel

To get the highest possible production at the lowest possible cost requires the use of exactly the right wheel for the job. This is feasible in mass production shops where the same types of castings are snagged day after day. Tests under actual operating conditions will determine which wheel is best. But where a wide variety of castings must be ground, to have exactly the right wheel for each job would result in excessive wheel inventories. Consequently, general purpose wheels must be used, many of which will not be the ideal ones. Therefore the best all around compromise wheel must be chosen. But it is a mistake to standardize on too few varieties merely to keep wheel inventories low, for what is saved in investment will be lost through high costs and low production.

When selecting a wheel be sure to consider total costs — not wheel cost alone, which is a common mistake. When labor and overhead are taken into account, the wheel cost is often the smallest part of the total cost. It seldom pays to select a rapid wearing wheel in order to secure a high rate of production. A wheel that wears only reasonably fast is very often the cheapest because the increased production reduces labor and overhead.

With rare exceptions, for snagging carbon, alloy and stainless steels, annealed malleable iron, tough bronzes, and forgings of carbon, alloy and high speed steels, the best abrasive is aluminum oxide.

Hard materials and those of low tensile strength such as gray iron, unannealed malleable iron, chilled iron, brass, soft bronze, aluminum and aluminum alloys are ground best with wheels of silicon carbide.

In general, the coarser the abrasive

grains, the faster the material removal. On a given material the coarser grains penetrate more deeply than fine ones. Obviously the depth to which a given size of grain will penetrate depends upon the characteristics of the material, the pressure between wheel and work and the spacing of the grains. Thus soft materials permit the use of larger grain sizes.

Only light pressures can be used on light floor stands and portable machines. Therefore to secure the required penetration grains of from 14 to 20 grit are best. Of course for especially good finishes finer grains would be needed.

Greater penetration is secured with a given size of grain when there is wide spacing between the grains. Such wheels are called "open structure" wheels.

In selecting the type of bond, structure, and grade (hardness) of a wheel it is necessary to take into consideration the material of the casting, the area of contact between the wheel and work, and the pressure which will be applied.

Selection of grade should never be left to the operator for he is likely to prefer a soft, fast cutting, fast wearing wheel, especially if he is paid on a wage incentive basis. Management should standardize the grades to be used as a result of tests and careful analysis of over-all costs.

Shows Wheel Selection

Most snagging wheels are made of resinoid or rubber bond, since they can be operated at speeds as high as 9500 surface feet per minute and so remove material rapidly, giving low over-all costs in spite of their higher selling price.

In the accompanying table of wheel recommendations typical wheel selections for various jobs are given. It is not pretended that they are exact, for local conditions such as machine condition, shape and size of the castings and even the personal skill of the operator would make slight deviations necessary. However, they are close enough to enable only two or three wheels to be tested, instead of dozens as might be necessary without such a guide.

If the machine is in good condition and the wheel well selected for the job, there are still other factors which should be watched if high production and low costs are to be secured.

Thus, care should be taken to have the job done by the type of machine best suited to it. Like a wheel, a machine will not perform at its best on work for which it was not designed.

If too-hard wheels are furnished, the operator may try to increase production through increased pressure by adding heavy weights to swing frame machines, or pressure bars on floor stands. Such excessive pressure increases wheel wear and often the increased production is secured at disproportionately increased abrasive cost. Pressure must be dedermined carefully to suit the grade of the wheel. Wheels of proper grade break down and keep sharp with only

Highly maneuverable Marschke Swing Grinder "doing business" in a Penna. steel mill. No outboard bearing to obstruct view of work.

MARSCHKE 3-SPEED SWING FRAMES SAVE YOU MONEY

because . . .

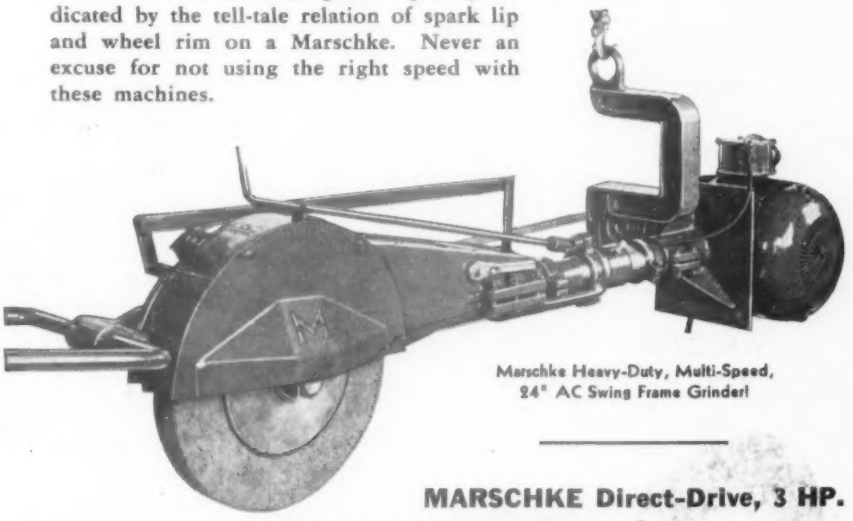
having selected the right grade, grit and bond . . .

1. Wheel is held firmly between accurately machined flanges.

2. Wheel rotates smoothly upon a stiff true-running spindle.

3. Wheel can be kept at right cutting speed because incorrect wheel speed is plainly indicated by the tell-tale relation of spark lip and wheel rim on a Marschke. Never an excuse for not using the right speed with these machines.

4. And Marschke design includes the *conveniences* for making changes quickly so they are made when needed to maintain maximum grinding efficiency.



Marschke Heavy-Duty, Multi-Speed, 24" AC Swing Frame Grinder!

MARSCHKE Direct-Drive, 3 HP. "In-Between" GRINDER

A Big-Little Grinder that fits Between Heavier Type Swing Frame Grinders and Portable Hand Tools!

Has a 3 HP., 1800 RPM. motor driving a 12" x 2" wheel. Is 5 ft. long and weighs 300 lbs. Standard equipment includes magnetic push button control, overload and undervoltage protection, bronze bushed swivel collar suspension with handle along each side of frame and one above guard. Unusually maneuverable.

The Marschke Line includes Floor Stand, Pedestal Type and Swing Frame Grinders and Buffers in over 70 standard specifications for AC and DC power with motor sizes ranging from 1 to 40 HP. and with 10" to 30" wheels.

MARSCHKE QUALITY GRINDERS AND BUFFERS

VONNEGUT MOULDER CORP. INDIANAPOLIS

CORTLAND GRINDING WHEELS CORP'N.
Chester, Mass.
lequired From Salesmen
D TO HOME OFFICE IN DUPLICATE
Plant [redacted] DATE 7/27/37
Town
espond with

Do not write in this column.
For office use only.

L-2039
5 each
149-Q-7A13
149-Q-7C13
141-R-9A15
144-R-8A14
149-R-8A14
149-R-8C14
Oxa. Res.
Report -
149-Q-7A13
Very Satis-
factory.
reordered -
36 on L-2369
24 on L-3149
100 " M-30
150 " M-264
100 " M-353
25 " M-363
75 " M-393
100 " M-432
200 " M-682
100 " M-908

M-1032
3 each
149-S-6A14
149-T-6A15
14-R-7A15
14-S-8F18
Oxa. Res.
14-S-8F18 very
satisfactory
reordered
50 on M-1233
100 " M-1441
100 " M-1453
200 " M-1611
100 " M-2270
200 " M-2297
200 " N-363
100 " N-544
100 " N-1173
100 " N-1500
100 " N-1533
100 " N-1663

Plus WHEELPOWER
Minus WHEELCOST
PROVED BY RE-ORDERS

Company: A large steel corporation.

Work: Removing scale and imperfections from finished sections of open hearth rolled structural steel. Finish: of no consequence.

Machine: Rotor and Ingersoll-Rand high speed portable air grinders — wheel speed 4600 R.P.M.

Wheel: Type No. 1, 8" x 1" x 5/8", Oxaluma Resinoid.

Results: Repeated tests to determine exact grain and grade for maximum work and life of wheel showed a normal wheel life averaging 25% over wheel formerly used. This is another example of PLUS WHEELPOWER and MINUS WHEELCOST that is proving CORTLAND *for better snagging.*

For Better Snagging

CORTLAND
GRINDING WHEELS CORP.
CHESTER, MASSACHUSETTS

a comparatively moderate pressure.

Another trick to obtain high production is to grind with only the corner of the wheel instead of the whole width of the face. This builds up the pressure on the corners excessively, breaks down the wheel and distorts its face.

If the work is not traversed across the whole face of the wheel when snagging with floor or bench stands, the wheel face will become grooved, and the resulting excessive truing to restore the shape of the wheel will wear the wheel down too rapidly.

The wheel and work should be brought together carefully, easily and smoothly, otherwise the wheel will become out-of-round, or broken outright by the sudden impact.

Cutting off gates, sprues and risers close to the casting with abrasive cut-off wheels or other means obviously reduces the amount of material that will have to be snagged off, and so increases production and reduces costs.

There is considerable difference of opinion among foundrymen as to whether malleable castings should be snagged before annealing, "in the hard", or after annealing, "in the soft." Which is best depends largely upon the nature of the work.

Thus, if there are to be subsequent machining operations on the ground surfaces, it is best to snag the castings in the hard, since the snagging may generate enough heat to cause an annealed casting to go back to the hard, or at least to cause hard spots, which would interfere with machining.

Another advantage in grinding in the hard is that the annealing will to some extent cover up the grinding marks and improve the appearance of the casting.

A considerable burr is formed when grinding in the soft—none when grinding in the hard. A case where such burr is highly objectionable is when grinding up to a cored hole. The burr formed in the hole will require an additional operation to remove it.

When heavy sprues and gates must be snagged from malleable castings of thin section, it is best to grind in the soft since there is less likelihood of their cracking than when ground in the hard.

N.F.A. Plans Meeting In New York

The forty-sixth annual meeting of the National Founders Association will be held at the Waldorf-Astoria Hotel, New York, Wednesday and Thursday, Nov. 17 and 18. The administrative council and committees of the association will meet on Tuesday, Nov. 16, and the alumni dinner will be held Tuesday evening.

The program for the annual meeting will feature discussions of labor policies, renegotiation and termination of contracts, and reconversion of foundries for postwar production.

Activities of FOUNDRY GROUPS

St. Louis

THE St. Louis District Chapter of the A.F.A. opened the new season with a meeting Sept. 9 at the De Soto Hotel. L. A. Kleber, new chairman of the chapter, presided. E. E. Ballard, vice chairman and chairman of the program committee, reported that the meeting programs were completed through January. A. E. Hilliard, chairman of the entertainment committee, reported that plans were under way for the usual Christmas party in December. Walter Zeis, chairman of the membership committee, announced that membership of the St. Louis Chapter was at an all-time high, with additional members in prospect.

The certificate awarded by the American Foundrymen's Association for first place in the national patternmaking contest held last spring was presented by Chairman Kleber to Ralph Peterson of the Central Pattern Co., St. Louis.

The chapter turned out a better than average attendance to hear Pat Dwyer, engineering editor, THE FOUNDRY, talk on "Gates and Risers." Mr. Dwyer's talk was ably presented and created considerable discussion.—*J. H. Williamson, secretary-treasurer.*

Wisconsin

THE Wisconsin Chapter of the A.F.A. started the new season with its third fall sectional meeting at the Schroeder Hotel on Sept. 10. George Dreher, chapter president, called the meeting to order and after introducing the speakers for the group sessions, spoke briefly on present-day and future conditions which will confront the industry. Upon conclusion of Mr. Dreher's remarks, the group divided into the various sectional meetings.

Chairman Frank Waldenmeyer of the gray iron group introduced the speaker of the evening, Charles Burgess, Union Carbide & Carbon Corp. Mr. Burgess spoke mainly on "Latest Developments of Ladle Additions" and during his talk emphasized the necessity of balancing the graphitizing elements to attain uniformity in gray iron.

The steel section was under the chairmanship of Charles Fuerst who introduced Prof. George J. Barker, University of Wisconsin, who talked on "Furnace and Ladle Refractories." This was followed by a discussion led by C. E. Bales, president of the American Ceramic Society.

The malleable section was directed by Chairman Harvey Osborn who introduced J. H. Lansing of the Malleable Founders Society. During his talk he brought out the important part which malleable iron castings are playing in the war effort.

The nonferrous section was under the leadership of Chairman B. D. Claffey who introduced J. Gitzen, Delta Oil Products Co. The latter spoke on the production of cores for aluminum and magnesium castings.

The pattern section under the directorship of Chairman George Smitka heard Walter Schmidt who spoke interestingly on models and their relation to the pattern shop. — *Darold W. Thiem, chairman, publicity.*

Quad-City

OPENING meeting of the season for the Quad-City Chapter of the A.F.A. was held at the Armstrong Hotel, Rock Island, Ill., Sept. 20 with an attendance of 102 members and guests. Chairman W. E. Jones presided.

Harry W. Dietert, president, Harry W. Dietert Co., Detroit, was the featured speaker, discussing "Behavior of Molding Sands and Cores at Elevated Temperatures." He outlined modern methods for determining hot strength, deformation and expansion of various sand mixtures at pouring temperatures. Suggestions for correcting molding and coremaking practice were given, and a motion picture was shown to illustrate points brought out in the talk. An interesting discussion period followed.—*H. L. Creps, secretary-treasurer.*

Chesapeake

FIRST meeting of the current season for the Chesapeake Chapter of the A.F.A. was National Officers' Night held on Sept. 24 at the Engineers Club, Baltimore.

R. T. Covington, the American Hammered Piston Ring Division of Koppers Co., presided as newly-elected chairman of the chapter. The chapter members were honored by the presence of both the national A.F.A. president, Lee Wilson, and the national secretary, Bob Kennedy. The chapter also has been highly honored in having two of its members as national directors.

J. E. Crown, U. S. Naval Gun Factory, Washington, as both immediate past chairman and national director, spoke on the value of the foundryman in the present war program and complimented the chapter on its rapid growth in the 3 years of its existence.

Chairman Covington, who has been associated with the development of the chapter since the time when it was only an idea in the minds of Clyde Freer and Ed Horlebein, then called upon Larry Denton, chapter secretary-treas-

Speakers' table at recent meeting of the Quad-City Chapter of the A. F. A. Shown left to right are A. D. Matheson, past chairman of the chapter; Harry W. Dietert, principal speaker; W. E. Jones, chairman; R. E. Wilke, vice chairman, and C. H. Burgston, director

urer, and E. W. Horlebein, the Gibson & Kirk Co., as first chapter chairman, to review the chapter's history since its initial meeting in 1940.

Another guest was Harry Reitinger, past-chairman of the Philadelphia Chapter and present director, who spoke as a member of the Inter-Chapter Affairs committee of the national body. After his address the members signified to Mr. Reitinger their interest in renewing the regional meetings between the New York, Philadelphia and Baltimore Chapters in the fall of 1944.

Our genial friend and national secretary, Bob Kennedy, has always been thought of as a sort of godfather to the Chesapeake Chapter, and the members were delighted to hear and see him again after a two-year absence from their meetings. Bob spoke very interestingly of the work of the national office and then introduced Mr. Wilson. This was the first time President Wilson had met with the chapter's members, and he received a most cordial reception. His talk on apprentice training, foremanship training and the future of the industry was most enlightening. He also spoke on the relation between the A.F.A. and the industry's trade associations in a manner which indicated a spirit of close co-operation between them.—*George F. Kuhn, reporter.*

Increase Your Foundry Production with a

Lectromelt **Top Charge Furnace**

★ Moore Rapid Lectromelt Furnaces are increasing foundry tonnages by charging faster and reducing the time between heats. Lectromelts are available in a capacity range from 100 tons to 250 pounds. Write for complete information.

ARMY (E) NAVY

PITTSBURGH LECTROMELT FURNACE CORPORATION

Pittsburgh, Penna.

MOORE RAPID *Lectromelt* FURNACES

Southern California

SMASHING all records for attendance the Southern California Chapter of the A.F.A. attracted more than 500 members and guests to the summer stag party held at the Lakewood Country Club on Aug. 7. Beautiful California sunshine marked the occasion as activities got under way early in the afternoon under the direction of Bill Emmett, Los Angeles Steel Casting Co., chairman of the entertainment committee.

Golf attracted a number of contestants, with W. G. McLean, Snyders Foundry Co., in charge of arrangements. Baseball had its usual prominent place on the program, as also did the various foot races, wooden horse races and horse shoe pitching. Cash prizes were awarded to those who distinguished themselves in the competition.

A delicious turkey dinner was served during the evening. Following distribution of door prizes a stage show topped the program. Missing from the festivities were two prominent chapter officers, Walter F. Haggman, president, having undergone an appendectomy the day before and E. M. Hagener, secretary, being the victim of a severe cold.—*B. O. Bender, publicity secretary.*

Northern California

FIRST meeting of the new year for the Northern California Chapter of the A.F.A. on Sept. 10 was attended by 92 members and guests, with 2 of the 17 non-members applying for membership. President Harry A. Bossi presided. Among others at the speakers' table were Charles J. P. Hoehn, senior past president, and Fred A. Mainzer, junior past president.

As there were a number of shop men in attendance, including the president of the local molders union, the occasion provided an opportune time to explain that proof of the association not being a bosses organization is found in the fact so many shop men are taking membership for the educational benefits to be derived. It was announced that the directors have endorsed the plan of appointing a foundry sands and molding materials committee to be composed of shop men. This group will make independent studies of local sands, and the results of their investigations will be used for a program at a later meeting.

Chairmen of various committees reported on their activities. Charles Marshall of the entertainment committee stated that the October meeting would consist of a golf party at Orinda Country Club. The secretary reported that members had responded so loyally to the appeal of the finances committee that he was ordered by the directors to mail all members a financial report as a supplement to the October Bulletin of Publicity Chairman Vosbrinks.

Dave Reeder, program chairman, introduced Andrew Ondreyco, principal speaker of the evening, who gave some interesting highlights on Australian foundries. He discussed the country's

natural and industrially developed resources, illustrating his talk by slides. One interesting feature of his remarks was that all public utilities are government owned, including the railroads. The track system is composed of three different gauges which has been a handicap to the country's war effort.—*G. L. Kennard, secretary-treasurer.*

Cincinnati

OPENING meeting of the new season for the Cincinnati Chapter of the A.F.A. was held at the Cincinnati Club, Sept. 13, with an attendance of 70. Edward H. King, chairman, presided. After a short business meeting, Chairman King introduced Gregor Ziemer, the principal speaker, whose subject was "Nazi Germany." Mr. Ziemer has traveled extensively throughout Europe and Asia and served 11 years as head of the American Colony School in Berlin. He presented a revealing analysis of European affairs and a vivid, intimate picture of Nazi Germany.—*Martin F. Milligan, secretary.*

E. Canada - Newfoundland

OPENING meeting of the 1943-44 season for the Eastern Canada and Newfoundland Chapter of the A.F.A. took place at the Mount Royal Hotel, Montreal, on Sept. 17 and attracted about 100 members and guests.

At a preceding executive meeting, presided over by the incoming chairman, E. N. Delahunt, the financial standing of the chapter was reviewed and found to be in excellent shape, a substantial cash balance being on hand after allowing for purchase of Victory Bonds. The program submitted by the program committee was approved and, it is expected, will be of interest and value to all members in its entirety. Stress is being laid on most practical aspects of foundry problems, while at least one "Quiz" program (October meeting) and one sectional roundtable evening are included. Membership has increased to 202, and good prospects for further gains are evident.

The subject for the opening meeting was "Why All the Fuss?" by Alex. Douglas, works manager, Peacock Bros. Ltd., Montreal.

Drawing on his 30 years of experience in the manufacture and maintenance of marine equipment, much of which has been concerned with British naval work, the speaker stressed the importance of thorough conformance with specifications. The Admiralty specifications, he pointed out, are drawn up on a basis of long and costly experience and are not, as is frequently supposed, designed deliberately to handicap the manufacturer.

It was the opinion of the speaker that the standard Admiralty gun metal, 88-10-2, is still superior for marine equipment to any of the alternatives and substitutes now being used, and that when tin once more becomes sufficiently available the original composition will be preferred by marine engineers. The all-around performance reliability of 88-10-2 gun metal has not yet been equaled. Bronzes have supplanted steel and iron castings in marine production markedly since the commencement of the war, owing to the former's greater resistance to shock.

While admitting the feasibility of salvaging some defective castings by good burning-on or welding practice, Mr. Douglas emphasized that the shocks and strains imposed upon marine equipment under today's conditions are extremely severe due to concussions caused by depth charges and bombing. No repairs should be permitted where any risk of failure due to the defect or its repair might conceivably cause collapse. He particularly condemned the practice of welding for repair without adequate subsequent normalizing treatment, particularly for steel and iron castings.

Mr. Douglas called upon the foundrymen to be thoroughly conscientious regarding the quality of their castings and most especially so where our fighting men's lives depended upon the soundness of their products. He suggested that the foundryman should ask himself if he would go into battle with the castings he had produced; also to put himself in the customer's place and reflect if he would buy the casting under consideration, the moral being "If you wouldn't buy it, don't sell it."—*A. E. Cartwright.*

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine available in any 3:1 speed variation from 100:300 or 1000:3000 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

Western New York

APPROXIMATELY 120 members and guests attended the meeting of the Western New York Chapter of the A. F. A. which was held at Hotel Touraine, Buffalo, N. Y., on Oct. 1. Frank E. Bates, chairman, presided and introduced the new officers and directors. He also announced the names of chairmen of various committees. Mr. Bates then turned the meeting over to Samuel G. Appelby, Buffalo Foundry & Machine Co., and technical chairman who introduced Fred G. Sefing, International Nickel Co., New York, as the principal speaker of the evening.

Mr. Sefing's topic was "Study of Molding Methods for Sound Castings". He opened his talk with the statement that the most important feature of a casting is its soundness and that this is more important than the metal from which it is made. Castings free from defects are dependable in service, more machinable, and can command higher prices, resulting in more profit for the foundry. Gate design is important and clean metal can be assured by various types of gates. Agitation of metal can be prevented by means of slotted gates. Rapid pouring is essential to get metal into the mold quickly as pouring temperature is more important than temperature at the spout. Porosity in many cases can be licked by increasing pouring speed.

Pouring in-gates should be rectangular as it gives a good fracture. Controlled directional solidification used in the steel foundry works well in any metal. Metal will freeze from thinnest and coldest metal to heaviest and hottest metal, provided there is no thin section to pinch it off. Step gating is an excellent way to pour castings of some height. Risers should be heavier than the section to be fed; metal in risers should be hotter than in the casting, and risers should be high enough to create hydraulic pressure to remove slag, gases, etc.

In gray iron, side risers are preferable to top risers. Chills should be used only when it is impracticable to feed. Metal freezes more rapidly where a chill is placed, and promiscuous use of chills chases the defect to other parts of the casting. Chills should be clean, and large enough to do the job. Adequate venting of molds is essential. An interesting discussion period followed Mr. Sefing's talk.—*J. Ralph Turner, Secretary.*

SAHARA WINS

Hands Down!

(Name on Request)

In 1939 he installed 570' of 24" x 6-ply Hot Sand Conveyor, splicing together SAHARA and a competitive belt. This impartial test—both brands operating under identical conditions—resulted in the standardization of SAHARA for hot sand service.

REXALL

for Cold Sand and Castings

•

No Rubber—Prewar Quality

IMPERIAL BELTING COMPANY

1750 SO. KILBOURN AVE. CHICAGO, ILLINOIS

Central Indiana

REGULAR monthly meeting of the Central Indiana Chapter of the A.F.A. was held at Hotel Washington, Indianapolis, on Oct. 4. Attendance at the session was 90 members and guests. Dr. James T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, Ala., was the principal speaker. He presented an interesting discussion of cupola operations in which he stressed particularly carbon control.—*Robert Langsenkamp, secretary.*

Chicago

CHICAGO CHAPTER of the A.F.A. started off its 1943-44 activities with a record attendance and outstanding technical program for its meeting, Oct. 4, at its customary quarters, the Chicago Bar Association. Several features combined to bring out approximately 315 members and guests.

"Foundry Sand Control" was the meeting subject, and in the expert hands of Harry W. Dietert, president, Harry W. Dietert Co., Detroit, provided interest to steel, malleable, gray iron, and nonferrous foundrymen alike. As a part of his presentation, the speaker showed 1200 feet, or four reels, of color motion picture illustrating the behavior of foundry sand and cores at high temperatures. Discussion was conducted following each reel, since each handled one phase of the subject.

The pictures showed the action of the face of the mold and of the core, of sands and cores at pouring temperatures, and of sands and cores that produce defective castings. Through the film and through his remarks and discussion, Mr. Dietert explained how corrected sand mixes behave at pouring temperatures,

and gave fairly complete details as to how the corrections were made.

Chairman M. F. Becker, vice president, Whiting Corp., Harvey, Ill., presided at the business meeting immediately following dinner and Vice Chairman A. S. Klopf, vice president and foundry manager, Hansell-Elcock Co., directed the technical program.

Announcement was made that the Chicago chapter has affiliated itself as a charter member of the newly established Chicago Technical Societies Council, organized to promote the interests of technical groups in the district. Official delegates of the chapter are Bruce L. Simpson, president, National Engineering Co., and Mr. Klopf, the former having been elected a director of the council.

A resolution was adopted condoling the death on Sept. 23 of Oscar C. Olson, sales representative, S. Obermayer Co., a long-time member of the chapter.

A notable ceremony of the meeting was the award of certificates to 15 young foundrymen of the Chicago area for completion of a course in cast iron metallurgy conducted at Illinois Institute of Technology, under the joint sponsorship of the institute, the Engineering, Science and Management War Training Program of the U. S. Office of Education, and the chapter. The course, comprising 15 weeks starting last May, with lectures and laboratory periods twice a week, was provided at government expense and made available to carefully selected candidates. Charles Walton, Association of Manufacturers of Chilled Car Wheels, was the instructor, assisted by Miss Irene Johnson, of the institute staff.

Receiving certificates were: Vernon Carstens, Fred Fox and John Harwood, Link-Belt Ordnance Co.; Cecil Crawford, David Bradley Mfg. Co.; Arthur Kranzow, North Western Foundry Co.; Sam Marabella, Chicago Hardware Foundry Co.; John Pauly, Nichol-Straight Foundry Co.; Karl Blom, Lindgren Foundry Co.; Robert Daubert, Elizabeth Street Foundry; Joseph Florian, Charles C. Kawin Co.; Walden Greenlee, Greenlee Foundry Co.; Anthony Panozzo, Griffin Wheel Co.; Peter Poelstra, Whiting Corp.; Clarence Schlacks, sales representative; and Ted Arzt, T. L. Arzt Foundry Co.

For having led the class with a grade of 91, Anthony Panozzo was presented with $10 in war saving stamps by the chapter. A second and similar course was started Oct. 7.—*Erle F. Ross.*

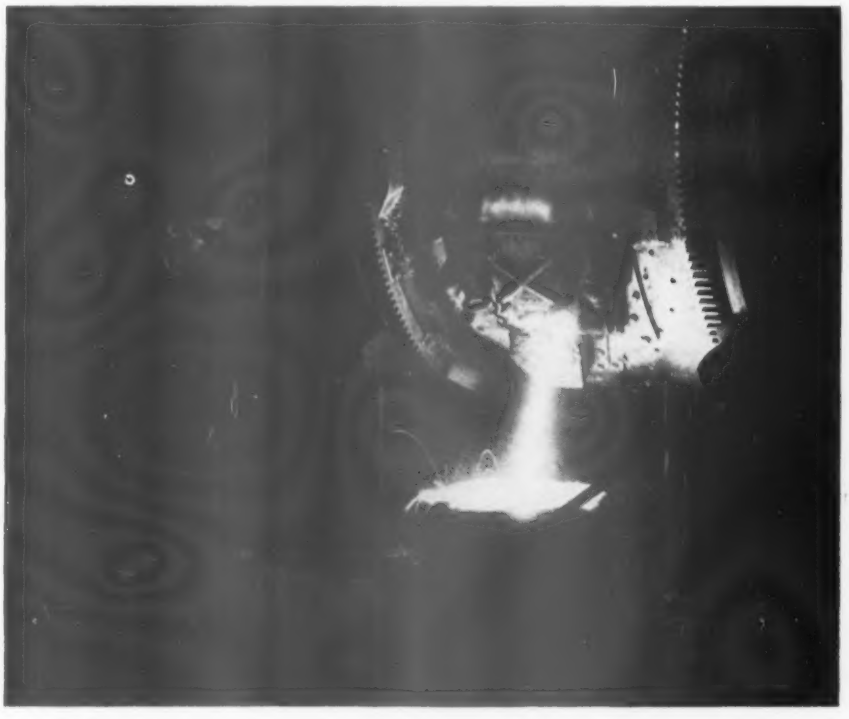
Inflammability of Metals Studied

Investigation of the inflammable characteristics of many of the powdered metals is being carried on by the Bureau of Mines at its laboratories at Bruceton, Pa., where some of the equipment used for study of coal-mine dust has been modified to handle metallic dusts and other powdered material submitted by industries.

Some of the bureau's work in the testing of metallic dusts is described in its circular 7241, "Annual Report of Research and Technologic Work on Coal, Fiscal Year 1942," by Dr. A. C. Fieldner and W. E. Rice, senior fuel engineer. During the past fiscal year, the bureau conducted experiments on 70 samples of various powders, such as dusts from coal mines, metal powders, synthetic resins, shellac, and dust from powder plants, steel mills and metallizing operations. Among the metallic dusts tested were aluminum, antimony, cadmium, chromium, copper, iron, lead, magnesium, tin, zinc and zirconium.

Accident Prevention

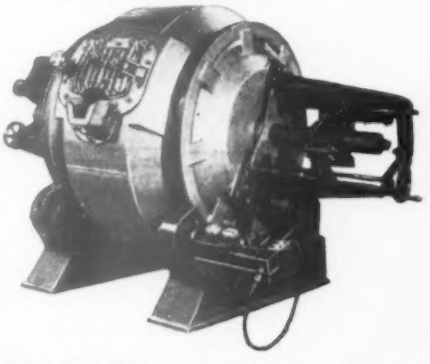
American Mutual Liability Insurance Co., 142 Berkeley Street, Boston, recently has issued a 94-page booklet 4¾ x 7½ inches entitled, "Foremanship and Accident Prevention in Industry" to aid in teaching foremen their responsibilities. It is divided into seven chapters covering such topics as foremen in industry, causes of accidents, accident control in manufacturing methods, maintenance, housekeeping, personnel control in accident prevention, and aids to foremen. While primarily issued to the firm's industrial policyholders, sample copies are available to executives of plants engaged in war work.



You reduce dirt, fumes, and labor to a minimum with a Detroit Electric Furnace

Because there are no products of combustion and since melting takes place in a closed chamber, the Detroit Rocking Electric Furnace reduces occupational hazards such as dirt and fumes to a minimum. And because of its automatic operating features, a maximum, uniform rate of production is assured with less man-hours and easier work. By providing extra, quickly interchangeable shells, you can melt all kinds of metals—ferrous or non-ferrous.

Summed up, a Detroit Rocking Electric Furnace in your iron or brass foundry provides, 1) greater safety, 2) less labor, 3) faster melting, 4) lower metal losses, 5) higher quality castings and 6) less machine shop scrap. Write today for complete facts.



Detroit ELECTRIC FURNACE DIVISION • KUHLMAN ELECTRIC COMPANY • BAY CITY, MICH

WITH THE EDITOR

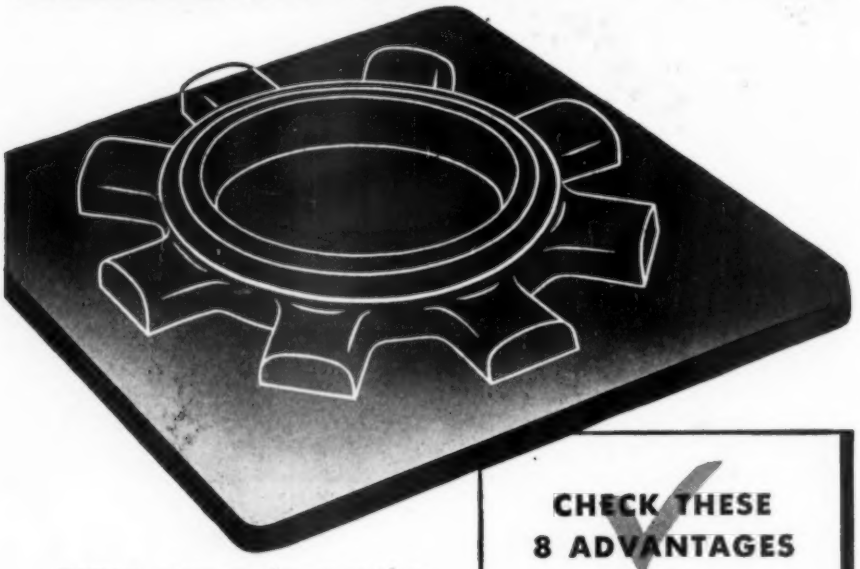
A BOUQUET for the American malleable industry and a good analysis of what it takes to do business with any government department, is contained in an editorial in the Sept. 27 issue of the *Foundry Trade Journal*, our esteemed British contemporary. I am sure that the malleable industry appreciates greatly the kind words of Vincent Faulkner, editor of that publication, and that all foundries should consider carefully his statement that *"high government officials are as susceptible to enlightened publicity and advertising as is the man on the street."* The editorial is as follows:

AMERICAN AGGRESSIVENESS

We were somewhat astonished when we learnt that a high American ordnance official, Colonel Merle H. Davis, made publicly a severe criticism against the malleable foundry industry — "it lacked aggressiveness." We were not satisfied in our own mind as to what exactly was meant by the expression "aggressiveness" until we consulted the dictionary compiled by Webster, the great American lexicographer. Here it was revealed that "enterprise" is its synonym and certain British interpretations are designated colloquialisms. Yet this charge of lack of aggressiveness, confined as it was to the commercial field and then whittled down to approaches to the service departments, would cut but little ice on this side of the Atlantic, because of the tacit assumption that the fighting services know their business. There may be, however, a good deal of common sense behind Colonel Davis' plea for an aggressive policy by sections of industry in relation to government departments, for maybe there are as many Colonel Blimps in Washington as in Whitehall. In British circles, an "aggressive" policy—the word this time being used with its colloquial implication — is usually pursued when there is a feeling abroad that an industry is not getting a square deal. This leads us to suggest that the continuous prosecution by an industry of an enterprising policy reduces the likelihood for it ever to pursue an "aggressive" policy. This is exemplified by the high esteem in which Colonel Davis holds the steel casting industry, for in this case a well thought out co-operative publicity campaign has been operating for several years; it has resulted in the use of vast quantities of cast armor in connection with tanks and other wartime weapons. The views of Colonel Davis as to the enterprise of the American steel-founding industry are couched in the following terms:—"The steel casting industry has been particularly aggressive in selling itself to the Ordnance Department. Perhaps that is one reason why ordnance expansion alone has multiplied the steel casting industry by five in the last two years. Almost half the total weight of a modern M4 tank with cast armor hull consists of steel castings." Apparently, however, the steel castings industry was not sufficiently aggressive to sell the idea of cast steel aerial bombs, for the colonel states:—"Two years ago my British friends tried to impress upon me the advantages of cast steel aircraft bombs. Thank goodness your ordnance department did not fall for that! In the first place, cast steel is not the proper material for the American concept of an efficient demolition bomb. In the second place, an industry already multiplied by five ought to be satisfied with confining itself to the items for which it is best suited." So that's that! And, anyhow, the steel bomb, judging by the pictures of Hamburg, Dusseldorf and Essen, seems to be reasonably effective! In this country the foundry technicians are unanimous in according to the American malleable industry the palm for enlightened research, at least comparable with that emanating from the steel-foundries. We are not sufficiently familiar with the inside work-

Speed up Production with

TRANSITE Core Plates



TODAY, when maximum production in minimum time is so vital, Transite Core Plates can be of invaluable assistance. These core plates are smoothly sanded trays of asbestos and cement, specially compounded and treated for holding cores during the drying or baking processes. Transite Core Plates have earned an enviable performance record in their many years of service in the making of cores for brass, aluminum, gray iron, malleable iron and steel castings. For complete details, write today for brochure No. PP-10A. Johns-Manville, 22 East 40th St., New York 16, N. Y.

CHECK THESE 8 ADVANTAGES

1. Light Weight
2. Corrosion Resistant
3. Less Breakage
4. Low Warpage
5. Easy to Clean
6. Strong and Durable
7. Economical
8. Non-Critical Materials

JM

Johns-Manville

TRANSITE Core Plates

ings of American industry to pass an authoritative opinion, but it seems to us at this distance that the main difference between the two is the publication by the steel interests of an extraordinarily well compiled book, which cannot fail to impress even the most old-fashioned of Colonel Blimps. The major lesson to be learnt by British foundry interests from the American controversy, reinforced as it was by a badly authenticated accusation of poor quality, is that high government officials are as susceptible to enlightened publicity and advertising as is the man in the street, and it is incumbent on manufacturers' associations to pursue, year in and year out, an "aggressive" policy.

* * *

The quantities of publicity material on plastics now appearing in the public press indicates to a certain extent the strong competitive factors developing for the postwar period. Appearance of that material brought to mind an article in the Oct. 1, 1924, issue of THE FOUNDRY under the heading "Meeting the New Competition." How closely history may repeat itself, with only minor variations, is shown in the first two paragraphs from that discussion, which are as follows:

Foundrymen are confronted by new complexities in the battle for business. The war and the period immediately following brought about a tremendous expansion in casting manufacturing capacity, which, during the past three or four years has not been fully engaged. Further, the encroachment of stampings, forgings and other products has been noted in many lines, while the competition within the ranks has become more intense.

Doubtless these conditions will bring about the industrial decease of a number of shops, but the fatalities can be immeasurably reduced by the application of sound business judgment and the teachings of experience.

* * *

According to a recent report of the Department of Commerce, production of malleable castings moved up slightly in August to a total of 67,515 tons as compared with 66,011 tons in July and 56,304 tons in August, 1942. Total production for the first 8 months of the year was 553,371 tons compared with 513,760 tons in the same period of 1942 and 551,518 tons in the first 8 months of 1941. But the real story of what is happening in the malleable industry is shown in statistics for orders booked. These have increased from a total of 63,978 tons in August, 1942, to 108,505 tons in August, 1943. These totals indicate clearly that something must be done to remove some of the pressure on the malleable industry. The key to the situation is relief from the manpower shortage. At the same time attention should be given to increasing facilities through the further application of equipment, to the conversion of foundry facilities not now extensively occupied to the production of malleable iron castings, and to the substitution in some instances of other types of castings. Malleable foundrymen should bend every effort to solve this pressing problem, for the industry cannot afford to have any part of the war effort held up for want of malleable castings.

* * *

Secretary Bob Kennedy of the A.F.A. recently sent out a directory of A.F.A. committee personnel and chapter officers and directors. This list represents the volunteers of the foundry industry, a group of over 400 technical and practical men who are giving of their time and energy to further the science of the casting of metals. The entire foundry industry owes these men and the hundreds who have gone before them during the past 47 years a deep debt of gratitude.

The Steel Founders' Society of America has been doing an excellent job in advertising steel castings. A recent change in pace has provided some hard hitting copy emphasizing the fact that steel castings have something that cannot be gained by other methods of fabrication. I particularly liked the following copy which states a mighty good case for cast steel in the production of machines for either war or peace:

A PROMISE

There is just one reason for using Steel Castings—for making anything.

And that is to make better machines, or better mechanical parts—and make

HAVE YOU TRIED
DAYTONS
ON YOUR SNAGGING OPERATIONS?
The universal war time foundry cry is "production—more production"—a call that must be met.
On snagging operations, Dayton wheels can help you get that additional production—are daily doing just that in steel and iron foundries all over the country.
Daytons remove stock fast.
Daytons wear down slowly.
The line is complete, standard or special grades and grains, for all types of grinders.
Try them on your particular requirements.
SIMONDS WORDEN WHITE COMPANY
710 NEGLEY PLACE • DAYTON, OHIO
DAYTON
SNAGGING WHEELS

them faster or at lower cost.

It is an entirely safe statement that we never could have reached our present peak war production—the greatest any nation has ever known—without the Steel Castings Industry.

Through the technical advances of this Industry, it is possible to form metal in shapes and combinations of shapes that cannot be produced by any other method.

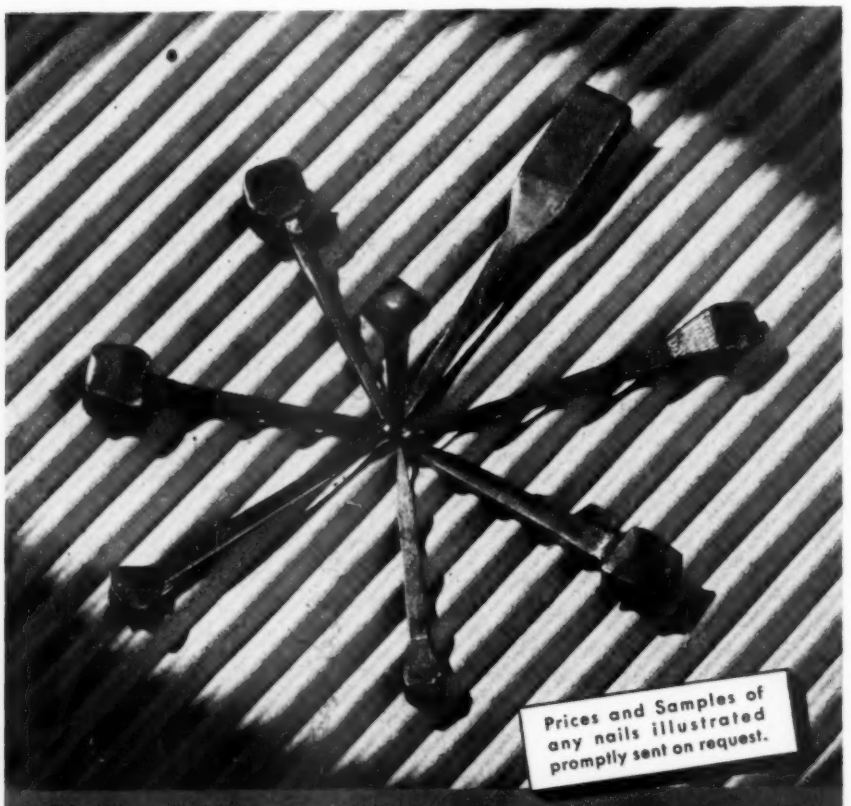
It is possible to do this in steel with a wide range of mechanical properties, to meet a variety of conditions in production and in service.

All this at speeds and costs that are not even approached when such parts are "whittled" out of solid blocks of metal, or made by joining many small pieces of metal together, or by hammering metal into shape.

The improved "know-how" of this Industry, brought into new prominence by war production, promises still greater improvements and economies in the manufacture of peacetime products in the better days ahead of us. F.G.S.

National Wins "E"

National Engineering Co., Chicago, has been awarded the Army-Navy "E" for its "fine record in the production of war equipment." The presentation took place on Oct. 20.



SMOOTH, CLEAN *CHILL NAILS* ASSURE SOUND CASTINGS

Because Capewell foundry chill nails are *cold rolled* from the finest soft iron, they are smooth, bright and clean. They fuse readily. With Capewell you have the most complete line from which to select the right nail for your purpose. . .

THE CAPEWELL MFG. CO., Hartford, Conn.

CAPEWELL

FOUNDRY CHILL NAILS

Suggests Control in Eye Disease

By M. HEIMAN, M.D.

An epidemic disease of the eyes has recently occurred in several industrial plants in this country and it is desirable, at this time, to present information on the subject so that physicians, and others, in charge of the medical problems of plant personnel may be in a better position to deal with such possible situations in their own plants.

The disease, although previously known under many names, is now termed virus keratoconjunctivitis, since it is apparently due to a virus, is invariably a conjunctivitis, and, in a large percentage of cases, involves the cornea. It appears that virus keratoconjunctivitis has been endemic in the Far East for many years. In September, 1941, it assumed epidemic proportions in a shipyard on the West coast of this continent. More recently epidemics which occurred in New York state, Connecticut and Michigan have been brought under control.

The agent causing the disease is apparently a neurotropic virus as has been shown by the preliminary experimental work of Sanders. It does not appear that trauma to the eyes bears a relation to the disease, although this question is not adequately answered at this time. The disease may occur to either sex and at any age. There is evidence that medical personnel has had a hand in transmitting the disease.

Not Difficult To Recognize

The clinical history of the disease, the appearance of the eyes, and the laboratory findings make virus keratoconjunctivitis not too difficult to recognize. Generally, the patient will come to the medical department complaining of either a foreign body in one of his eyes, or that his eyes feel as if he had "sand" in them. At this time ophthalmologic examination usually reveals a full-blown condition. It is not unusual to have the patient refer to symptoms in one eye, and for the examination to reveal bilateral disease. Some epidemics have been characterized by a high incidence of bilateral involvement and in others it has been predominantly unilateral. In the typical case the bulbar and palpebral conjunctiva will be found edematous, with the upper lid more severely involved than the lower. Congestion of the conjunctiva, lacrimation and a few hemorrhagic spots will be observed, although the last is not an invariable finding. A pseudomembrane is often found, especially in the inferior conjunctival sac. Characteristically, the amount of discharge is minimal.

Although corneal involvement generally occurs early in the disease, it may not appear until the conjunctival condi-

Reprinted from *The Industrial Bulletin* issued by the Industrial Commissioner of the state of New York.

tion has begun to show moderate improvement. The corneal involvement causes an aggravation of all the local symptoms and is characterized by subepithelial opacities, generally in moderate numbers and often involving the pupilary area.

The appearance of lymph glandular swelling, usually of the preauricular gland and less frequently the submental or cervical chain, was found with high frequency in some epidemics, and less so in others. The glands become palpable and tender. Search should always be made for their appearance. In some instances the glandular involvement may be of short duration so that at the time the physician sees the case it may have disappeared. In such cases it may be possible to obtain a history of localized pain on mastication.

Bacteriologic examination will be negative since it will be observed that the organism, if any, found will be too sparse to have been the cause of the eye disease. Scrapings of the conjunctiva typically show cells of the monocytic series predominating and only a few polymorphonuclear leucocytes.

Satisfactory Treatment Lacking

Virus, keratoconjunctivitis usually lasts at least 10 days. The conjunctivae clear, but the corneal involvement may persist for months, and may leave permanent scars. From the data at hand it appears that satisfactory treatment is lacking. Cold compresses may be applied for relief of symptoms. Local use of sulfonamides has been recommended and may be of value in preventing the formation of styes.

In order to prevent disease from spreading the following suggestions are made:

1—Medical personnel should be aware of the disease by becoming familiar with its appearance.

2—Meticulous cleanliness in all eye examinations by the washing of hands and proper sterilization of all instruments used for eye examination or treatment.

3—Isolation of cases is suggested, although its efficacy is doubted by some.

4—Education of persons who have the disease so that they may take precautions to prevent its spread to others.

5—Adequate sterilization of goggles.

Office Employes to Wear "E" Pins

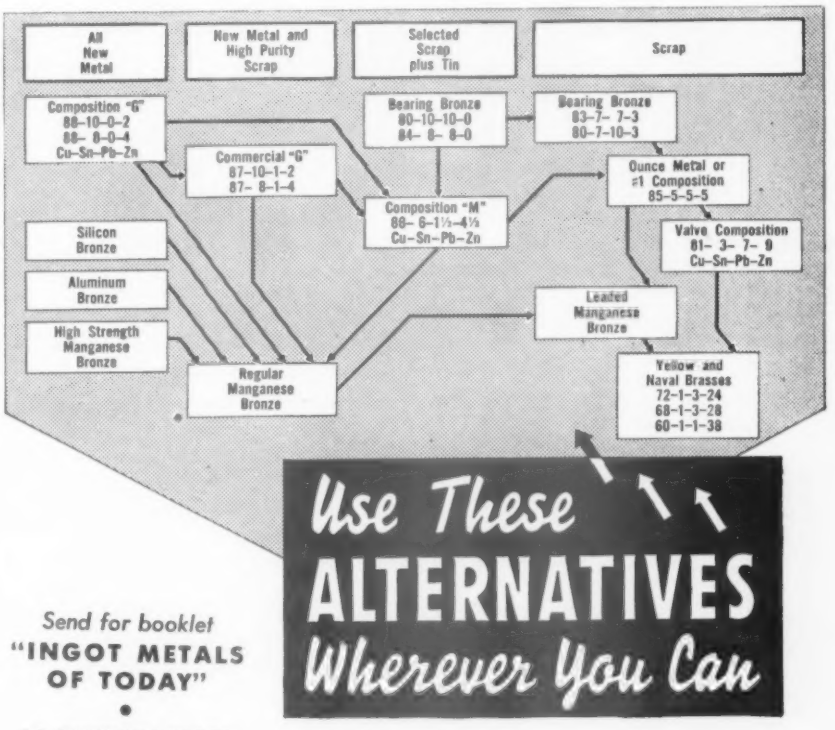
Home office and experiment station employes of the Hercules Powder Co., Wilmington, Del., now are entitled to wear Army-Navy "E" pins. War Department rules permit employes of the central office of a corporation to wear the "E" pin after a majority of the employes has won the award. Hercules has received the "E" at seven of its plants, involving two-thirds of its 31,000 employes.

Cast Iron Borings Urgently Needed

Millions of pounds of the tiny shavings left after cast iron is drilled or machined are now critically needed for explosives, dyes, and chemicals to aid in preserving rubber. E. I. du Pont de Nemours & Co., Wilmington, Del., stated recently that each year it requires more than 100,000,000 pounds of these shavings, called chemical borings, for its plants and the ordnance works it operates for the government.

Borings are used as a reducing agent in making aniline for dyes. Aniline, in turn, enters into the manufacture of dimethylaniline, employed in making tetryl, a booster for high explosives and diphenylamine, a stabilizer for smokeless powder and a required chemical in the preservation of natural and synthetic rubber.

Soft, oil-free borings, such as result from machining of cast iron piston rings, shock absorber housings, transmission housings, pulleys, and textile machinery, are badly needed in carload lots. An average box car carries 90,000 pounds of borings. Plants machining cast iron are urged to sell their borings, rather than remelting or shipping to blast furnaces. Hard borings are used, too, but the shortage is in the soft, oil-free ones.


All New Metal
New Metal and High Purity Scrap
Selected Scrap plus Tin
Scrap
Composition "G" 88-10-0-2 88- 8-0-4 Cu-Sn-Pb-Zn
Bearing Bronze 80-10-10-0 84- 8- 8-0
Bearing Bronze 83-7- 7-3 80-7-10-3
Commercial "G" 87-10-1-2 87- 8-1-4
Ounce Metal or #1 Composition 85-5-5-5
Composition "M" 88- 6-1½-4½ Cu-Sn-Pb-Zn
Valve Composition 81- 3- 7- 9 Cu-Sn-Pb-Zn
Silicon Bronze
Aluminum Bronze
High Strength Manganese Bronze
Leaded Manganese Bronze
Regular Manganese Bronze
Yellow and Naval Brasses 72-1-3-24 68-1-3-28 60-1-1-38

Use These
ALTERNATIVES
Wherever You Can

Send for booklet
"INGOT METALS OF TODAY"

•

16 STANDARD INGOT METALS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax-Hamilton Gear Bronze
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

Notice how the arrows on the W.P.B. chart point to the *right*. . . . They show how alternative materials *currently available* can be utilized by foundrymen as now permitted by many designers. The purpose is to conserve primary metal at the mine through increased use of secondary ingots. Sometimes great ingenuity is called for, yet remember this:

The first program for scientific control of ingot metal was set up by Ajax 45 years ago. The result has been metal and practical technical follow-through in which Ajax increases your production by reducing rejects.

THE **AJAX METAL COMPANY**
ESTABLISHED 1880 PHILADELPHIA

ASSOCIATE COMPANIES:
AJAX ELECTRIC FURNACE CORP. Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTROTHERMIC CORP. Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC. The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ENGINEERING CORP. Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces

WASHINGTON NOTES ★ ★ ★ ★

BALANCE between supply and requirements of most basic raw materials is closer to being attained today than at any time since the war started, but the date on which manufacture of peacetime items will be resumed on any major scale is nowhere in sight. If and when the time comes—and it may occur within the next six months—that more iron and steel is available than is required by present consuming outlets, the surplus will be distributed on the basis of most pressing needs first. Which means that the railroads, mines, utilities and petroleum producers are more likely to receive extra helpings than that the common civilian goods will be enabled to go back into production.

★ ★ ★

The supply situation is not universally "over the hump" despite improvement in the picture as a whole. Alloy steel capacity is adequate, but there are some tight spots in carbon steel. Most of the alloys are in the clear, a factor in this situation being the reclamation of alloy steel scrap. Aluminum stocks are picking up, but now there is a problem in the disposition of secondary aluminum. Graphite supplies for crucibles are adequate. Raw materials in the least favorable position are pulp, lumber and leather, while among semifabricated items, malleable iron castings still leave considerable to be desired from the standpoint of supply.

★ ★ ★

THIS matter of material shortage is far from static. For instance, not long ago it was preferable to employ lumber in construction work in order to save steel. Today, considerable tonnage of concrete reinforcing bars is available and its use is recommended to help relieve the shortage in forest products. Concrete structures designed with a minimum amount of steel and a maximum amount of concrete actually are wasteful of materials and transportation.

★ ★ ★

Use of secondary aluminum for certain purposes is barred by specifications, but attempts are being made to locate additional applications which will help to ease requirements for other metals and at the same time absorb the surplus of remelt aluminum. In a move to conserve tin supplies, greater use of regular manganese bronze in preference to high-tin-bearing compositions is being sought. Tin consumption for alloying purposes recently has led all other uses, and adequate conservation measures are highly necessary.

★ ★ ★

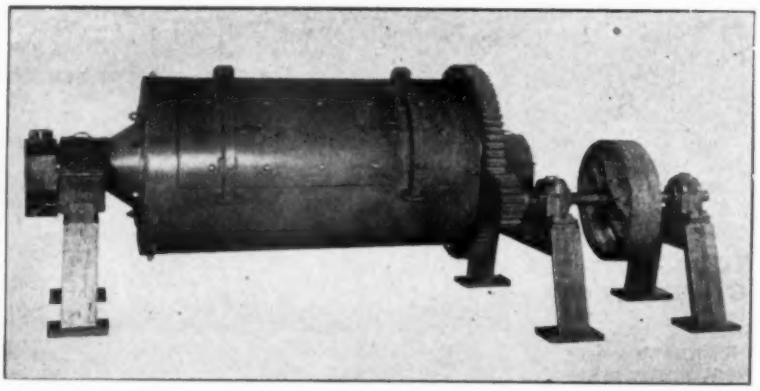
WHILE industrial and governmental engineers and designers establish the specifications which foundries are expected to follow in castings production and therefore must take the initiative in curtailing use of tin through increased application of manganese bronze, it is up to the foundries to be in a position to furnish this grade as the demand develops. Consequently, the Conservation Division of WPB is urging foundries to become acquainted with the technique involved in the production of such castings. WPB also is seeking more foundries to make magnesium castings, now that larger quantities of that metal are becoming available.

★ ★ ★

Production of ferrous castings, particularly gray iron, naturally is being affected by the declining output of machine tools and will be hit even harder next year. This loss of business will be offset at least partially by heavier requirements elsewhere, although these will be of relatively small benefit to gray iron producers when compared with the shrinkage in the machine tool market. War Food Administration has announced plans for distribution of twice as much new farm machinery next year as in

HAYNES

EQUIPMENT



TUMBLING MILL

• This new tumbling mill is equipped with a new lid device which fastens over each end of the lid and is provided with tightening screws which hold the lid in place and keep it from warping. This mill has a 1" shell, is heavily built throughout for long service and rough usage and can be furnished in the following sizes:

36" x 40"—36" x 48"—36" x 56"—36" x 66"—36" x 73"

NOTE: Two sizes carried in stock: 36" x 66" and 36" x 73".
IMMEDIATE DELIVERY.

Write for further information and prices.

HAYNES FOUNDRY EQUIPMENT CO.
1734 Lake Street—Kalamazoo, Mich.

MOLDING MACHINES — LADLES — BRASS FURNACES — CORE OVENS

1943, *and more equipment probably will be acquired by the railroads. Despite a* 43 *per cent cut in construction work at home this year, it is estimated that production machinery will have been increased* 21 *per cent in* 1943 *and may go higher in* 1944.

★ ★ ★

AT PRESENT, about 16,000 freight cars are scheduled for 1944 delivery to the railroads, but this will be boosted as more material becomes available. Locomotives scheduled for next year's production total 4000, these being for military, lend-lease and domestic needs. To facilitate the increased need for castings for motive power OPA has upped the ceilings on all locomotive castings except main frames, superheater headers, gears and gear cases.

★ ★ ★

Shipments of machine tools recently have totaled more than twice the volume of new orders less cancellations. As of Sept. 1 *backlogs amounted to* $386,-792,000, *but at the August rate of shipments these unfilled orders would be wiped out in about four and a half months.*

★ ★ ★

NO SMALL problems are involved in perfecting arrangements for the termination of war contracts, but it is expected that a procedure ultimately will be devised which will provide an orderly process which will prevent undue damage to the financial structure of companies involved. Contracts involving 8 billion dollars already have been terminated, but these have created little more than a ripple because in most cases they were supplanted by new contracts. When the war ends and there are no new contracts it will be a different matter.

★ ★ ★

Principal problems to be met in the equitable termination of war contracts are the making available of cash sufficiently soon to prevent wrecking those companies having limited liquid assets; the disposition of material on hand; and the arriving at a fair formula for settlement of undelivered portions of contracts. Considering that there are between 350,-000 *and* 400,000 *prime contracts outstanding, plus about* 1,000,000 *subcontracts, the job is a large one, but the fact that it is improbable the war will end simultaneously throughout the world will tend to slow down the termination procedure.*

★ ★ ★

SOME observers look for the end of war in Europe to lift a major portion of the current strain on our national economy —possibly as much as 80 per cent. At the same time, certain individuals identified with the war production program take the opposite view, stating that the heavy load of producing for war will be largely translated into one of providing for the rehabilitation of the stricken European countries. Even England, it is pointed out, will require considerable time to get back on its feet where it can manufacture the ordinary needs of its citizens.

Meanwhile, greatest emphasis in current and prospective war production is being placed on aircraft, with some shifts indicated for future volume of certain other items. The probable trend for 1944 *will be increased output of signal equipment and ammunition but fewer guns and tanks, and continued active building of ships with the Victory model supplanting the Liberty type in the merchant field.*

★ ★ ★

THE NEW Victory ship, while admittedly an emergency craft, will be far superior to the Liberty and is expected to have a real place in post-war trade. She will be powered with turbines and will be speedy enough to hold her own with the merchant fleets of other nations after the war. The first few Victory's just getting into production, will be equipped with Maritime Commission C-3 engines and should have a speed in excess of 17 knots.

★ ★ ★

Building of Liberty ships reached a new record speed in September, the 114 *ships delivered that month requiring an average of only* 41.2 *days from keel laying to delivery. The British are building a ship comparable to the Liberty but yards in Britain cannot approach the tonnage output of this country, partly because the blackout limits them to one*

Castolin Eutectic®

EUTECTIC*

(Means Lowest Binding Alloy)

LOW TEMPERATURE WELDING

FREE LATEST

WELDING DATA BOOK

Contains the Answers to Hundreds of Wartime Welding Problems

Contains vital facts to speed up your production and cut your welding costs with Eutectic Low Temperature Welding. Also valuable information on:

Production Welding

Joining dissimilar metals and dissimilar gauges without burning • Design simplification • Substitution of butt joints for lap joints, etc.

Salvaging Defective Castings

Effectively at low cost • Completely machinable, invisible welds • Ideal for thin walled or heavy castings in all metals.

Maintenance Welding and Tool Salvaging

"Hard-to-get" tools costing up to $180 and requiring up to 50 weeks for delivery, salvaged for re-use in a few minutes at a cost of but a few cents.

Ordnance Plant Engineer writes: "Book very instructive, send ten more for distribution."

Write for Welding Data Book FN

See our Exhibit at the 19th Exposition of Chemical Industries **BOOTH No. 403** Madison Square Garden, N. Y. Dec. 6-11

*Reg. U. S. Pat. Off.

EUTECTIC WELDING ALLOYS COMPANY
Originators of the Low Temperature Welding Process
40 WORTH STREET, NEW YORK 13, N.Y.

EUTECTIC WELDING ALLOYS COMPANY
40 Worth St., N. Y. 13, N. Y.

Please send your latest Welding Data Book

Name_____

Company_____

Address_____ City_____

shift a day. Prefabrication as we know it is practiced little by the British, and their welding is very limited compared to our standards. Nevertheless, the British man-hour output is said to be higher than in America, largely because virtually every man over there is employed on actual ship construction while we have a percentage of our men working on safety, labor relations and other phases of work intended to make life easier for the regular workers.

★ ★ ★

PRODUCERS of malleable iron castings have been authorized by OPA to apply for price adjustments where the maximum price is not sufficient to warrant continuance of production of castings necessary to the war effort. Previously, applications for adjustments were considered by OPA only if the casting involved was being made in connection with a government contract or subcontract.

★ ★ ★

Permission for foundries to acquire 500 pounds or less of molybdenum to fill authorized controlled materials orders or orders rated AA-5 or higher, without going through allocation proceedings, has been granted by WPB.

★ ★ ★

A NEW type of award to plants—the National Security Award—has been created by the Office of Civilian Defense. It is granted to plants and other essential facilities for outstanding achievement in protecting their employes, physical property and production processes against air raids, fire, sabotage, accident and other dangers. Unlike the Army-Navy "E" or Maritime Commission "M" it is not limited to war plants. Among the first recipients are Carnegie-Illinois Steel Corp., Caterpillar Tractor Co., Western Electric Co. and Bethlehem Steel Co. Various other nominations for the award are being considered. Nominations may be made by OCD, the Army, Navy or by a plant itself to OCD.

★ ★ ★

OCD is concerned over possible slackening in vigilance of civilian and industrial plant defense groups. It points out that these organizations have proved invaluable in catastrophes of accidental cause, and that moreover the danger of sabotage and bombings will increase as defeats make the enemy more desperate.

★ ★ ★

A NEW publication, designed to aid business men and government officials in obtaining information on all products, materials, and services handled by the War Production Board is being issued by WPB every four weeks. Titled "Products and Priorities," it gives the reader the numbers of applicable WPB orders and forms, all necessary CMP references, and the WPB division and section handling the item or service in question. It is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, at $2 a year.

★ ★ ★

CMP paper work is to be reduced materially under a new procedure being worked out by WPB. This will have the effect, after the first quarter of 1944, of eliminating two out of every three CMP 4-B quarterly applications, with authorizations made on an annual basis. By the end of this year it is expected that PD-1A applications involving up to $2500 will be processed in WPB field offices instead of at Washington. The present limit is $1000. Appeals under additional "L" and "M" orders also are to be handled in the field.

★ ★ ★

LIMITATION Order L-288, governing gray iron, malleable iron and bronze and brass pipe fittings, has been amended by WPB to add an item to the appendix listing pipe fittings which may be manufactured under the order. The amendment adds the 4-inch, 300 pound steam working pressure malleable iron female ground joint union to the appendix.

★ ★ ★

Smaller War Plants Corp. has set up by regions throughout the country a technical advisory service to aid small plants. It will put at the disposal of small manufacturers requiring technical research in the solution of production problems various information drawn from governmental agencies, trade associations, technical and scientific organizations and publications, and the research laboratories

"BRANFORD"

• Why let clogged up Hoppers, Bins, Chutes, Screening Devices, etc. slow up your production.

• STEP UP production with the installation of "Branford" Pneumatic Vibrators and eliminate damage to equipment by sledging.

• The "Branford" Vibrator is Quick Acting, Durable, Powerful in action and Economical in air consumption.

• Send us your equipment specifications. We will recommend suitable size vibrator with full information and descriptive literature.

NEW HAVEN VIBRATOR CO.
NEW HAVEN, CONNECTICUT

Branford Plate Vibrators
Air Tool Fittings
Sprayers, All Kinds
Shake-Out Vibrators

1915 BRANFORD VIBRATORS U.S.A.

Hopper Vibrators
Container Loading Vibrators
Annealing Pot Vibrators
Vibrator Tables

of educational institutions and private industry.

★ ★ ★

SCRAP shipments from auto graveyards have taken a downward turn. The August movement of 86,882 net tons was far below the average for the first six months this year. Cars purchased by auto wreckers in August totaled 60,312, compared with an average of 85,000 monthly in the first half.

★ ★ ★

Planned apprentice training programs which include both vocational and academic secondary schooling and on-the-job training are helping somewhat in the demands of war plants for young workers in many areas. Apprenticeship programs providing for completion of high school have made greatest headway in California, Wisconsin, Connecticut and Virginia, but this plan also is being instituted in a number of highly industrialized states.

W. G. G.

READERS' COMMENT . . .

Literary Corn

To the Editors:

In the October issue of The Foundry I was extremely delighted to note the manner in which Pat Dwyer's old friend Bill, manhandled a story published some time before in a prominent national magazine. The theme of the story was the truly remarkable achievement of the hero in producing a 125-ton casting, a feat that never had been attempted before for the simple reason that there was not a foundry in the world capable of melting and handling that amount of metal. My reaction to the story was the same as that of any practical foundryman * * * Literary corn, blue ribbon, first prize! Following Bill's expose I read it a second time just to absorb an additional dose of the real "Genuine, blown-in-the-bottle shop talk." Association of ideas brought to mind the Aesop fable of the jack daw who did a brief bit of strutting with a few peacock feathers stuck in his tail!

Maxwell Y. Snow
Circuit Foundry Instructor
State of Wisconsin

Use a Small Cupola

To The Editors:

During the past few years in your question and answer department I have noted quite a bit of comment on the use of small cupolas. I have operated two cupolas, one 18 inches and the other 20 inches in diameter, for over 20 years with satisfactory results where proper precautions are taken. The scrap must be broken into small pieces about the size of an average person's hand, the coke must be high grade, 2 to 3-inch size, and the blast must be what may be termed moderate. Any coke with a carbon content less than 86 per cent will cause plenty of trouble in a small cupola. The 18-inch cupola has four 4½ x 4½ tuyeres 12 inches above the bottom plate. The average heat melted in a little over an hour includes six 350-pound iron charges, with 41 ½-pound coke splits. No limestone since the cupola is not slagged. In the 20-inch cupola the four 4½ x 5½-inch tuyeres flared to 4½ x 10 inches, are 16 inches above the bottom plate. The daily heat amounts to 4500 pounds made up of ten 450-pound iron charges with 52-pound coke splits. This cupola is slagged and melts at the rate of 3245 pounds per hour.

Robert J. Reynolds
Lufkin, Tex.

Awarded Third "E"

Norton Co., Worcester, Mass., has been awarded a third renewal of the Army-Navy "E", according to an announcement by Adm. C. C. Bloch, chairman of the Navy Board of Production Awards. Norton is the first company in the Worcester area to fly the three-star pennant.

Kelley-Koett Mfg. Co., Covington, Ky., manufacturer of x-ray equipment, has started a plant addition expected to be completed by Jan. 1.

Molten Metal Sprayed on Wood Patterns Prolongs Their Life

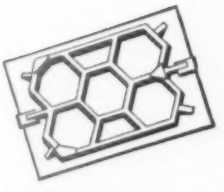
Molten metal sprayed on wood foundry patterns by a compressed air gun provides a protective coating against sand wear on the finished surfaces, thereby prolonging the life of the pattern and eliminating costly repairs.

The metal may be sprayed directly on the untreated wood surface of the pattern or core box. If the wood surfaces are hard or close-grained, a shellac primer is first applied, the metal being sprayed on before the shellac dries. The thickness of the metal coating is about 5 thousandths of an inch.

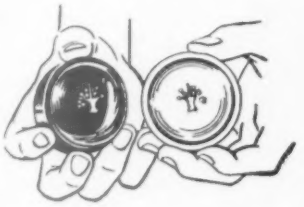
The spraying equipment consists of a portable, self-contained gun-type sprayer which melts the metal and is thermostatically controlled.

We hope this has proved interesting and useful to you, just as Wrigley's Spearmint Gum is proving useful to millions of people working everywhere for Victory.

You can get complete information about this method from Alloy-Sprayer Company, 2039 Book Building, Detroit, Michigan.



This wooden pattern coated with sprayed metal has given service far beyond its normal life.



Fine detail easily recorded in the alloy sprayed onto pattern.

X-56

STUDY MALLEABLE CASTINGS

(*Continued from page* 125)

rather than a characteristic of the iron.

Excessive phosphorus contents in steels are avoided because they tend to cause embrittlement, particularly at room temperature or below. To determine the effect of phosphorus on malleable irons, the phosphorus contents of two of the irons used in the study were restricted to 0.10 per cent with the intention of obtaining data that might shed some light on the effect of phosphorus on the low temperature properties of malleable iron. In comparing the properties of the normal phosphorus irons, *A* and *B*, with those containing less than 0.10 per cent phosphorus, *C* and *D*, it is evident that the only test in which the low phosphorus irons showed any superiority was in the notched bar Charpy tests where iron *C* has somewhat higher impact values at low temperatures. From these results, it might be concluded that low phosphorus contents confer no outstanding advantage.

An extraneous condition that probably had some tendency to obscure the comparison was the fact that both low phosphorus irons were short cycle malleables whereas the normal phosphorus irons were annealed in the normal manner. It is possible that the increased silicon in the short cycle malleables and the shortened annealing treatment would both have an adverse influence on impact properties.

The so-called "Flecto" treatment, i.e., air or water quenching of the test bars from 1200 degrees Fahr., led to variable results. Notched bar Charpy values for iron *B* were raised quite markedly, and the sudden drop-off in the double width bars at about —40 degrees Fahr. was eliminated. Charpy values for irons *A* and *G* also were raised somewhat by the heat treatment. For the other irons and other mechanical properties, no gains of any consequence could be observed, although there was some indication that tensile-impact values for iron *C* were raised by the quench from 1200 degrees Fahr. Toughness at room temperature, which is supposed to suffer as a consequence of "galvanizing embrittlement", was not affected appreciably by the quenching treatments. The results of the tests on the standard malleables *A* and *B* are indicated in Fig. 4 (Editor's Note: Similar curves developed for irons *C* and *D* are not included due to space limitations.) Insufficient test specimens were available for testing the effect of the heat treatment on all properties of the five malleables.

Differences Are Noticeable

In general, the pearlitic malleables were inferior to standard malleables in low temperature impact properties. This is evident from the curves in Fig. 4. The trends of properties with decreasing temperatures are much the same for the two types of malleable iron. However, it is noticeable that there are distinct differences between the pearlitic malleables themselves. Irons *E* and *F*, for example, are inferior to irons *P* and *H* in most of the tests, particularly in the wedge and unnotched bar impact tests. By reference to Fig. 8, which will appear in the concluding installment of this article, it may be seen that pearlitic irons *P* and *H* each have structures which contain considerable free ferrite distributed throughout the areas of combined carbon while in irons *E* and *F* the structure consists of spheroidized pearlite with the only ferrite in the form of isolated patches surrounding some of the carbon nodules. Perhaps the much better impact resistance of irons *P* and *H* may be attributed to the mode of distribution of combined carbon and ferrite in the matrix.

Individual values in the tensile-impact test were quite scattered, and in the case of iron *H*, it was impossible to establish a representative curve.

Mechanical property curves were developed for irons *A*, *B*, *C*, *D*, and *G*, over a temperature range extending from sub-zero temperatures to 1200 degrees Fahr., but due to space limitations of this article only those for irons *A* and *B* are

Save Vital Production Hours

with this Delta 17" Drill Press

Speeds Pattern Shop Operations — Saves Time — Cuts Your Costs . . .

Accuracy, safety and ease of operation, and low first cost make this Delta Drill Press a highly profitable piece of equipment for the Pattern Shop. Good-looking — sturdily built for long, hard service.

"Stand-out" Features

- Smooth-working Table-Raising Mechanism
- Built-In Depth Gauge
- Quill with 5" Stroke or Travel
- Streamlined Belt Guard for safety
- High-speed Models — 5 Speeds, from 700 to 4,750 R.P.M.
- Slo-speed Models — 5 Speeds, from 385 to 2,240 R.P.M.
- 12 Standard Models WF-3

Mail Now!

Ask your Delta distributor for full details. Mail coupon for new catalog.

THE DELTA MANUFACTURING CO.
622M E. Vienna Ave., Milwaukee 1, Wis.

Send information regarding Delta Drill Presses, and copy of latest Delta Catalog of wood-working and metal-working machines.

Name..... Position.....
Company.....
Address.....
City..... (.....) State.....

Delta router bits are used in the drill press for many accurate routing jobs.

included as Fig. 3. A composite representation of these curves, as well as those for the pearlitic malleables, is included in Fig. 6 which will be presented in the concluding installment of this article.

Tensile tests on machined bars were performed on the four standard malleables and the cupola malleable at room temperature and up to 1200 degrees Fahr. A notable feature of the test results is that, except for differences in the values of the properties for the different irons, the five malleables had the same characteristic curves for tensile properties throughout the temperature range. This will be observed readily in Fig. 6. Another interesting observation can be made regarding the actual changes taking place with temperature. Thus the ultimate tensile strength of all irons tested dropped about 10 per cent in value when the temperature was raised from room temperature to 212 degrees Fahr. The strength then increased to its former value when the temperature was raised to 600 degrees Fahr. The foregoing changes in tensile strength occurred, however, without a corresponding inverse relationship for the ductility, the elongation values having dropped grees Fahr., while ductility increased rapidly, the strength dropped at about the same rate until, at 1200 degrees Fahr., it was only about 25 per cent of its room temperature value. It is probable that the maximum in strength and minimum in ductility occurring in malleable iron at around 600 degrees Fahr. is related to the phenomenon of blue brittleness.

The curves in Fig. 3 show that the yield strength (obtained at 0.5 per cent elongation) and the modulus of elasticity of the five irons dropped steadily as the temperature was raised. The cupola malleable *G*, had little ductility at any temperature; otherwise, it reacted to temperature in the same manner as the other malleables.

The Charpy notched bar values reached a maximum at about room temperature for irons *A* and *B* and at about 200 degrees Fahr. for the short cycle malleable irons *C* and *D* and the cupola malleable *G*. Above these temperatures, the impact strengths dropped off gradually to a low point at 1000 degrees Fahr. This trend was common to all the irons in this group. In all cases, the double-width bar values were approximately twice the value for the single width specimens. Except for irons *C* and *D*, there were insufficient double width bars to observe their behavior above 600 degrees Fahr.

Unnotched bar tests at elevated temperatures were made only on irons *C* and *D*. The results of these tests have not been plotted, but the data show that the impact values drop off with temperatures above 200 degrees Fahr. in a manner analogous to that for the notched bars.

The wedge test results were unique in that the iron had a range of low resistance to repeated impact extending from about 500 to 800 degrees Fahr. Above and below this range, the wedge test values were higher, but the irons did not react to temperature changes to the same degree. Irons *C* and *D*, for instance, had low values down to sub-zero temperatures. The second annealing treatment used on *D*, which was mentioned in the discussion of low temperature properties, was very effective in raising these low values at temperatures below 400 degrees Fahr. Unlike the other irons, iron *B* dropped in wedge bar values from a value at 1000 degrees Fahr., equal to that at room temperature, to an extremely low figure at 1200 degrees Fahr. There was no change in the microstructure of the wedge bar tested at 1200 degrees Fahr. that would explain the low resistance of iron *B* at this temperature. The tensile-impact values dropped steadily from about room temperature to a minimum value at around 800 to 1000 degrees Fahr. and then rose at 1200 degrees Fahr. to a somewhat higher level. The stress factors in the tensile impact test were such that the increase in elongation that was present in the irons at 1200 degrees Fahr. more than compensated for the low values of the ultimate strength so that the additive result was an increase in the tensile-impact value. Iron *G*, the cupola malleable, absorbed very little impact energy throughout the testing temperature range.

Standard malleable *A* reached a value at 212 degrees Fahr. which was beyond

Convection heating under highly advanced conditions is the factor on which Lanly oven efficiency is largely based.

Heat is generated *economically* in this compact heater, delivered to the oven through a *balanced* system of distribution and *recirculated* to utilize every possible unit of heat.

All operations are under accurate automatic control to assure highly uniform and satisfactory results with the greatest possible economy.

The various types of Lanly foundry ovens available—rack type, car type, conveyor type, cabinet type, mould ovens and casting conditioning ovens—are all illustrated and described in our catalog. Send for it.

THE LANLY CO.
CORE OVENS
750 PROSPECT AVE. CLEVELAND, O.

the range of the machine and the tensile-impact strength did not again fall within the range of the machine until a temperature of —50 degrees Fahr. was reached, where one specimen of a pair dropped within the limits of the machine. At room temperature, it was feasible to increase the capacity of the machine to 220 foot-pounds; thus it was possible to break these specimens. However, in the case of the tests at other temperatures this added alteration involved too great a time lapse to be feasible. On the curve in Fig. 3, values for unbroken specimens are indicated with an arrow pointing upwards to indicate a value higher than that shown.

(To be concluded next month)

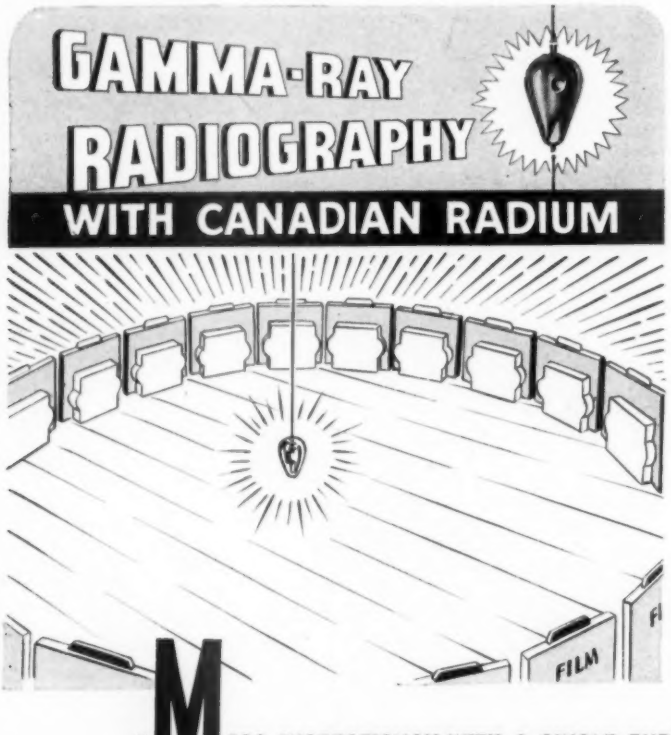
Copper Rings Cast Centrifugally

Consistently better quality copper parts for certain electrical apparatus are being obtained by centrifugal casting at General Electric's Schenectady works. In addition to providing a much denser metal the process eliminates the possibility of occurrence of sand holes according to the firm.

At Schenectady the copper is brought up to a temperature between 1200 and 1250 degrees Cent. (2192 and 2282 Fahr.) about 100 (212) degrees higher than the temperature required for sand castings. Meanwhile the runner box and mold are heated with torches to a temperature of approximately 250 degrees Cent. (482 degrees Fahr.).

After the drosses are skimmed from the surface, the molten copper is poured into the runner box from which it flows into the spinning mold. When more than one crucible is used, the opening between runner box and mold is plugged long enough to prevent any interruption between charges, thus avoiding the possibility of a cold shut.

The mold is kept spinning at about 300 revolutions per minute for 2 minutes. After the casting is removed from the mold, the impurities remaining on the inside of the ring are removed by machining.



"MASS INSPECTIONS" WITH A SINGLE EXPOSURE!

Because radium radiates Gamma-rays with equal intensity in all directions, it is an easy matter to make "mass inspections" of many similar metal articles at the same time.

Simply back up each specimen with a standard radiographic film, and arrange in a circle around the radium capsule. When their size permits, several specimens can be bound or otherwise affixed to each film.

This simple set-up is all that is necessary to make clear, easily interpreted radiographs of the internal structure of any metal objects—no outside power—no mechanism—no attachments required.

If your plant produces forgings, castings, welds or other metal fabrications, radium radiography can speed operations, insure soundness of quality and workmanship, help to improve foundry technique.

The simple, compact equipment for radium radiography can be set up anywhere, carried and operated anywhere without constant supervision or adjustment during exposure. Write for free Manual giving full information.

Free Manual

Reliable, profusely illustrated 80-page textbook on the fundamentals and technique of modern Industrial Radiography of metals with radium. Recently prepared for the metals industry by our research and technical staff. Write for your copy today, giving your name and company position.

Canadian
RADIUM & URANIUM
Corporation
630 FIFTH AVENUE · ROCKEFELLER CENTER · NEW YORK

Safety Training for Women Outlined

To assist industrial executives in formulating a safety program designed to make the woman employe safety-conscious, the policyholders service bureau of the Metropolitan Life Insurance Co., 1 Madison Avenue New York 10, has issued a report entitled, "Safeguarding the Woman Employe." Copies are available upon request to the bureau.

According to the findings of this study, successful safety training begins at hiring. At that time, many industrial employment supervisors outline the company's rigid safety rules. In some cases, applicants for employment are required to attend a short orientation course, during which an experienced safety supervisor points out the nature of the jobs and the hazards attached to them.

The report shows that one difficulty frequently met is the woman worker's resistance to the use of company-prescribed uniforms. This attitude has been overcome in some cases by allowing women employes to vote on several models of work clothing. Much of the resistance disappears when the required models are of their own selection. The report lists various methods for keeping the safety idea prominently before women workers.

Fire Guard Manual

Office of Civilian Defense, Washington, has issued a "Fire Guard Instructor's Manual" intended as a guide for instructors who are to give training to Fire Guards, the Citizens Defense Corps organization. It contains considerable information of value to those responsible for protection against fire in industry.

American Monorail Co., Athens and Halstead Avenues, Cleveland 7, recently has published an interesting booklet of pictures showing its various types of equipment and the application of the equipment in industry. Photographs of foundries show the use of monorail in handling metal, castings and other materials.

CONSERVATION CHART REVISED

(*Concluded from page* 121)

foundry output has increased 17 per cent, the use of new copper by ingot makers and foundrymen has decreased 22 per cent. That represents an achievement in conservation which is saving thousands of tons of primary copper per month.

"Since the publication of the original chart in January, the material supply situation has changed. Today, tin-bearing copper-base alloy scrap is much less readily available. On the other hand, fired cartridge cases are being returned from the battle fields in quantities in excess of that which can be readily used by the brass mills. These make excellent material for the ingot maker in compounding regular manganese bronze.

"Consequently, in this reissue of the chart, emphasis is placed on the desirability of changes into manganese bronze and yellow brass and less emphasis is placed on the changes into the secondary tin-bearing copper-base alloys.

"Those who are familiar with the earlier chart will note that all the alloys still keep the same relative position except that Naval brass, due to specification changes, is moved over into the column headed 'Scrap'. The Underwriter's Mixture has been dropped as it is no longer in use.

"The title of the chart has been changed from Down-Grading to Conservation to emphasize the fact that it illustrates the true definition of conservation—namely the effective use of our materials and resources. Actually, some of the properties of the alloys suggested as substitutions are superior to those of the alloys that they can replace. Manganese bronze, for instance, is a higher strength alloy than Composition 'G' or 'M'. It does not, however, have the same properties as a bearing metal, or the same resistance to certain types of corrosion, nor is it useful for intricate pressure castings.

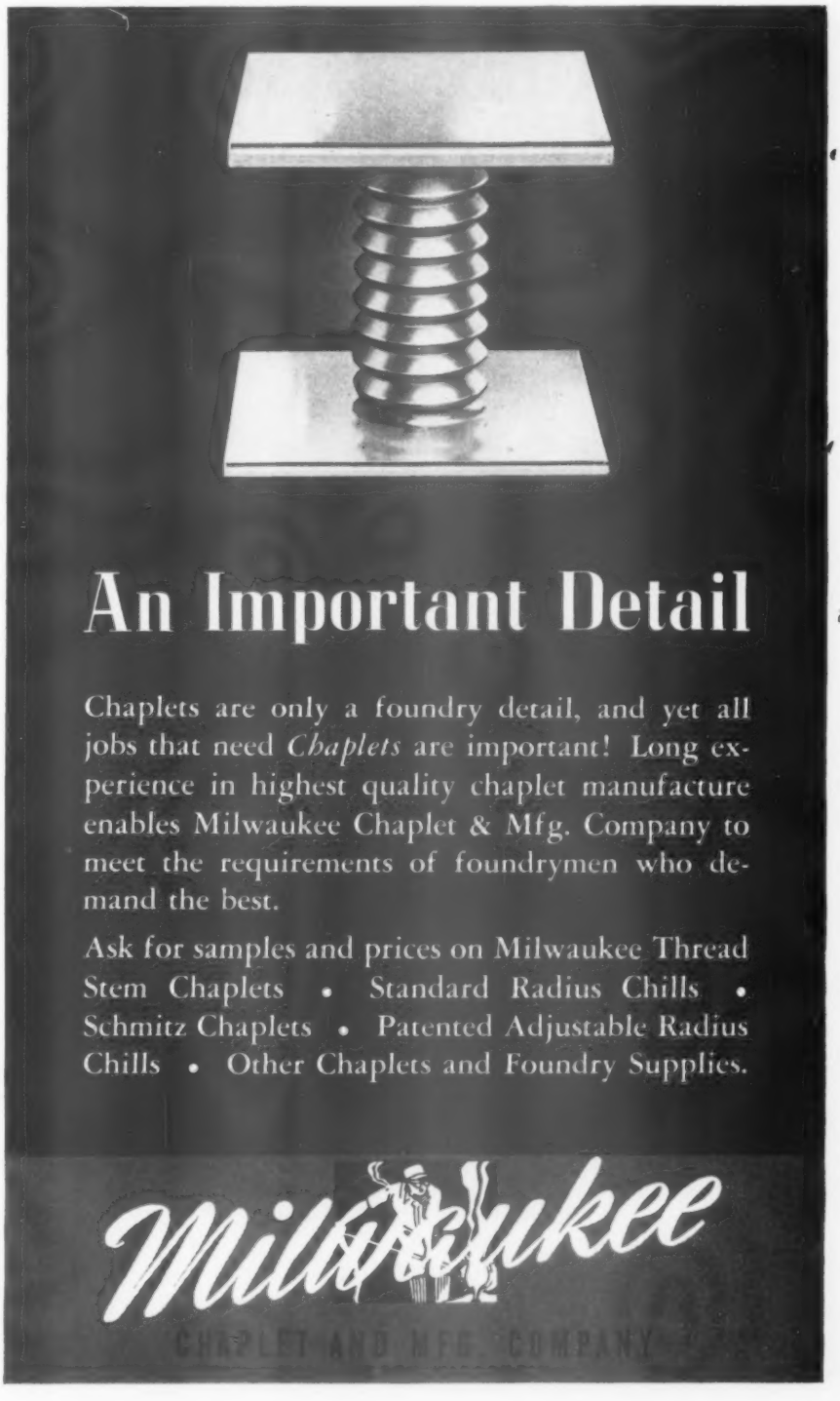
"By the use of this chart and its indications as to how best to utilize our current material supply, the designing engineer can direct his efforts anew to the efficient use of our resources.

"As before, the chart shows the important specifications grouped in columns according to the material required by an ingot maker or foundryman. Four classifications are given—All New Metal includes No. 1 and No. 2 copper, as well as electrolytic; High Purity Scrap, as noted, is exemplified by such items as fired cartridge cases; the Selected Scrap Plus Tin indicates the segregated tin-bearing scrap which requires tin sweetening to bring it up to specification requirements; the Scrap column designates those alloys which can generally be made from obsolescent and process scrap which has not been too carefully segregated.

"It is of interest to note here that recent specification changes, looking towards standardization of alloys, have narrowed the yellow brass specifications to the three covered by Federal Specification QQ-B-621 and A.S.T.M. Specification B 146. Other specification changes have been made since the chart was first issued so that today the specifications as listed approach a standardization never before achieved in the industry.

"Ingot makers, foundrymen and others who have direct knowledge of items where changes can be made to conserve critical materials should bring them to the attention of those responsible for the specifications involved. Specific recommendations should be made. In this the Conservation Division of the War Production Board will gladly be of assistance. But it is still a challenge to the design engineer to see that by a closer examination of end use he secures the best possible utilization of our material resources to win this war."

St. Louis office of the Sterling Wheelbarrow Co. has been moved to 3903 Olive Street, St. Louis. O. E. Steep is district manager.


An Important Detail
Chaplets are only a foundry detail, and yet all jobs that need *Chaplets* are important! Long experience in highest quality chaplet manufacture enables Milwaukee Chaplet & Mfg. Company to meet the requirements of foundrymen who demand the best.
Ask for samples and prices on Milwaukee Thread Stem Chaplets • Standard Radius Chills • Schmitz Chaplets • Patented Adjustable Radius Chills • Other Chaplets and Foundry Supplies.
Milwaukee

NEW STEEL FOUNDRY MAKES NAVY CASTINGS

(*Continued from page* 117)

ployes at prices which approximate actual cost as nearly as it is possible to estimate a figure subject to considerable fluctuation under present conditions. The department is managed by an ex-restaurant proprietor with extended experience. Staple foods in practically every form of can, jar, bottle and package are stored in a large room on the first floor of the building.

Wash, shower and locker accommodations, kept spotlessly clean, are provided for the men on one side of the main passage way on the lower or main floor. Similar accommodations for the women employes are provided in a room on the opposite side. The number of women employes has increased steadily since the plant was placed in operation. They have proved quite satisfactory in a wide variety of occupations formerly considered entirely outside their capability. They are operating as grinders, welders, coremakers, sand mixers, inspectors, and in the lighter crane cabs. The women are young, quick and adaptable and have no women's-place-is-in-the-home inhibitions or conventions to live down. The job to them is more or less an adventure, one of the roads of destiny leading to the ultimate goal where Prince Charming waits to assume all the burdens and obligations—maybe. They wear Judy O'Grady slacks in the shop, but on the way to and from work they are as dainty, trim and feminine as the Colonel's lady.

Other departments on the first floor of the service building include the superintendent's office and an exceptionally well equipped hospital in charge of a registered nurse. Services of a doctor are available, and a visiting nurse makes the rounds of the employes' homes. Office of the Naval inspector is located immediately inside the main entrance and opposite the superintendent's office.

Raw materials enter the plant on a branch line of the Philadelphia & Reading railroad. New sand arriving in drop bottom gondolas falls through a grating in the track and is carried by belt to an elevator and then distributed by a special crane to various points in a concrete storage chamber with a capacity of 17,500 tons, or the equivalent of 350 fifty-ton car loads. The bin and distributing equipment at the beginning of the filling operation are shown in one of the accompanying illustrations.

Stores Raw Materials

This bay of the foundry is served by one 25-ton and two 10-ton overhead traveling cranes. Most of their activity is centered over the center and opposite end of the bay where the charges are made up for the open hearth furnaces. Pig iron and scrap are unloaded from railroad cars by magnet and piled on both sides of a standard gage track which extends from the far end of the building to the wall of the mezzanine floor on which the furnaces are erected. Limestone, dolomite, and alloy materials are stored in concrete bins in the vicinity. The steel charging pans, loaded on buggies in groups of four, are filled with material and weighed on a large platform scale at the floor level. Then the load is lifted as a unit by the crane and placed on the track in front of the furnaces. An electrically operated charging machine picks the pans up one at a time and deposits the material on the hearth of the furnace.

While the entire foundry is maintained in a clean and orderly condition, the melting unit is especially worthy of comment in this respect. A high ranking official who has stumbled over the litter of many a charging floor in a long and active career, claims that the present installation is so near absolute perfection that it satisfies the dream of a lifetime. The checker chambers are above the shop floor level and the waste gasses pass through horizontal flues to two high brick stacks on the outside of the building.

In a space under the furnace charging

Blaw-Knox "hook-on" BUCKETS

take the least of your crane time...

Blaw-Knox Foundry Type Single Line Buckets are made *convenient* for you—they can be hooked on or off the crane block as required. They operate easily and they last long.

Blaw-Knox has a wide variety of foundry clamshell buckets to choose from—considering the available operating clearance, crane load capacities, working space limitations, character and state of material to be handled, safety features.

See Blaw-Knox Buckets in Catalog No. 1696—yours for the asking.

BLAW-KNOX DIVISION of Blaw-Knox Co.
2097 FARMERS BANK BUILDING PITTSBURGH, PA.
NEW YORK • CHICAGO • PHILADELPHIA • BIRMINGHAM • WASHINGTON

floor the ladles are lined, repaired, dried and preheated. The ladles are of heavy steel plate, welded instead of riveted. The bail, made up of an equalizer beam and two upright members which embrace the ladle trunnions, remains permanently in place on the ladle instead of dangling from the main hoist of the crane. With this arrangement the crane may be employed for lifting other heavy loads between heats. The first bay devoted principally to the production of large, heavy castings, the bay in which the ladles are filled with steel, is equipped with three electric traveling cranes with respective lifting capacity of 25, 50 and 75 tons. Three 5-ton wall cranes with range of travel the entire length of the bay are utilized for miscellaneous lifting of lighter loads, including mold and core parts. In this, as in practically every foundry, advantage is taken of the well-known fact that cranes may be trusted to lift loads well over their rated capacity. Duplicate crane installation is available in molding bay No. 4, and—with the exception of the wall cranes—in the chipping and cleaning bay No. 5. The center bay of the foundry is served by two 5-ton cranes and by a monorail system on each side which extends the full length of the bay.

Sand for the molds and cores is prepared at four stations, each equipped with two 8-foot diameter mullers mounted on platforms on the columns approximately halfway between the center and the end of bays 2 and 4. The new sand which forms the greater part of each mold or core is made up of 10 parts new silica sand, 1 part cement and 7 parts water. This combination when allowed to air dry for periods ranging from 24 to 48 hours, depending on the total bulk, becomes almost as hard as stone. It can be broken up readily when the castings are shaken out, but cannot be used again as facing material. However, a considerable portion is reclaimed and utilized as rubble or bulk material to fill the interior of the large blocks of sand which are used to form the inside and the outside of the molds.

From the shakeout station in front of each sand preparation unit, the spent material is shoveled through a grating over a conveyor which discharges into a pulverizer and by another conveyor and elevator into a storage bin. The amount of unreclaimable material, about equal to that in the average steel foundry, presents no problem. It is hauled away free by a railroad company and utilized for filling material. With this arrangement there is no unsightly dump to mar the symmetry and well cared for appearance of the property in the vicinity of the foundry.

(*To be concluded next month*)

Drops Specification

Emergency alternate Federal specification E-QQ-B-621 for commercial and naval brass castings has been cancelled due to a recent promulgation of amendment 3 to Federal specification QQ-B-621.

WPB Forms Piston Ring Committee

Appointment of a Piston Ring Manufacturing Industry Advisory Committee has been announced by the War Production Board. It consists of the following: David A. Cowhig, Wilkening Mfg. Co., Philadelphia; T. Latimer Ford, Koppers Co., Baltimore; A. E. Johnson, Hasting Mfg. Co., Hastings, Mich.; Herbert W. Knapp, McQuay-Norris Mfg. Co., St. Louis; George C. Landon, Wausau Motor Parts Co., Wausau, Wis.; Neil A. Moore, Sealed Power Corp., Muskegon, Mich.; H. M. Ramel, Ramsey Accessories Mfg. Corp., St. Louis; Don H. Teetor, the Perfect Circle Co., Hagerstown, Ind.; Harold G. Vaughan, Muskegon Piston Ring Co., Sparta, Mich.; F. M. White, Liberty Foundries Co., Rockford, Ill.

Will Hold Meeting

The Meehanite Research Institute of America Inc., New Rochelle, N. Y., will hold its annual meeting of members at the Cincinnati Milling Machine Co., Cincinnati, O., on Nov. 3 and 4. Important research data compiled by member foundries as a result of war production experiences will be presented and exchanged at the meeting.

1ST CHOICE *in the* AIRCRAFT *Industry*

Typical of DEMPSEY installations for the Nation's leading industries . . . . this aluminum melting furnace installed at Buick Motors Division of General Motors

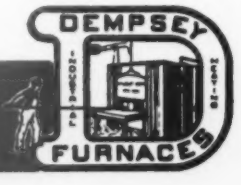
MORE ALUMINUM for Aircraft Engine Castings and extruded parts passes through DEMPSEY FURNACES than all other types of furnaces combined

FASTER Melting Time • Simple Single Valve Control • Easy Control of Tapping Speed • Special Metal Saving Models for Chip Melting • Sturdy Long Life Construction • Oil, Gas or Coke Fired.

These are some of the reasons why DEMPSEY furnaces are such an overwhelming choice for aluminum melting . . . these, plus the valuable reservoir of experience offered by DEMPSEY engineers and the fact that speed of installation is assured by the wide variety of types and sizes, the plans and patterns for which are *now ready.*

Write for literature on these and DEMPSEY Furnaces for Recirculating, Homogenizing, Pre-heating and Heat Treating

DEMPSEY INDUSTRIAL FURNACE CORPORATION
SPRINGFIELD, MASSACHUSETTS
FURNACES BURNERS
Offers Combined 50 Years' Experience Building:
DEMPSEY FURNACES since 1917 • GILBERT & BARKER since 1904



NONFERROUS CASTINGS FOR ORDNANCE

(*Continued from page* 109)

usage sanctions the use of the term when applied to any body of dried sand introduced into a mold to form part or all of either an inside or an outside contour. In the present instance many of the cores serve a double purpose in imparting the desired shape to both inside and outside parts of the casting in their vicinity. The smaller cores are made on the bench and the larger cores are made on a jolt roll-over machine.

Cope and drag patterns with set of cores in position, preparatory to setting on the cope and drag flasks and ramming the mold, are shown in Fig. 11. Ribs and other projections on the pattern locate the large master core accurately on the drag side. The two main parts of the core are fastened together by strands of wire inserted in projecting lugs on both sides. The wires are drawn up tight and twisted. Small rectangular pads, attached to the pattern on the left, guide the cope cores into place and hold them in place while the sand is rammed around and above them. Eye hooks attached to each core project a slight distance above the top of the cope where each hook is anchored in place by a rod and wedge resting on the cope bars. This feature may be noted in Figs. 8 and 10.

The completed drag half of the mold shown in Fig. 6 presents many interesting features, including the generous fillets on all corners and the perfect matching or flush face of that part of the mold formed by the rammed-up core (upper right and slightly darker than the surrounding green sand). This joint cannot be achieved where a dry sand core is placed in a green sand print, unless the molder takes times to finger tuck the green sand all around the joint, then add some green sand and slick it over.

To fill the mold with metal rapidly and uniformly, an almost continuous runner is formed in the joint about 3 inches outside the mold cavity. A number of shallow, well-rounded gates conduct the metal from the runner to the mold. Each gate is covered by a small cast iron plate. These plates limit or choke the flow through any one gate and thus assure an even distribution of metal. They act as skimmers to hold back any particles of dross that may have been created by the drop of metal through the sprues. In the cleaning room the gates are cut off on the runner side, or outside the skimming plates. The remaining stumps accompany the casting into the machine shop where they serve as a convenient means of attaching the casting to the face plate of lathe or boring mill for the first machining operations. Then they are removed.

Skimmer Cores Failed

In the early experiments, dry sand skimmer cores were placed in the gates, but were not satisfactory. They burned under the flow of metal and failed to perform their intended function. Slag and burned sand entered the mold with the metal and caused the castings to be rejected. Cast iron skimmers then were substituted with satisfactory results. They have been used hundreds of times and the only loss is through occasional breakage in removing them from the casting. They do not act as chills, as they are only ⅛-inch thick and, therefore, absorb only a negligible amount of heat. Any occasional dross that may escape the skimmers is caught in a channel or runner in the face of the cope side of the mold immediately above the runner in the drag. This feature is illustrated in Fig. 9. The central opening in each of the long runners is the sprue. The other two relieve pressure, prevent strain and act as flowoffs for any dross accumulation in the runners.

Fig. 8, a view of the closed mold, shows the position of the three sprues sprinkled with parting compound, the rods supporting the cope cores and the extent to which the cope is vented with a wire to facilitate the escape of gas and steam. The drag is vented in the same manner and small wood wedges are in-

COREMAKER:
"SINCE I'M UNDER OATH....

I'LL SAY THIS ABOUT **MOGUL BINDER..**

it makes good cores that dry out and *shake out*. You don't get green centers."

THE COURT: **Q.** "Tell the court what a green center is.'

COREMAKER: ***A.*** "The center of the core isn't dried out. *Mogul* gives high green bond value in sharp sand. *Mogul* holds it together. When the core is baking, the sand is open enough to let the gases out. And the core dries all the way through."

THE COURT: **Q.** "Don't the cores stick?"

COREMAKER. ***A.*** "No, Sir, Judge! You can shake cores out easy if you use *Mogul* and sharp sand."

THE COURT: **Q.** "How about using oil with *Mogul?*"

COREMAKER: ***A.*** "Sure. *Mogul* has a high hot strength, so no matter if the cores get hot *Mogul* keeps 'em stiff. And, let me tell you, judge, you can use *Mogul* as a binder in dry sand and green sand for molds. Castings come out clean because *Mogul* burns out and peels like an onion."

CORN PRODUCTS SALES CO.
17 BATTERY PLACE · NEW YORK CITY

serted between the bottom edge of the drag and the bottom board to provide a space through which steam and gas may escape readily when the mold is filled with metal. It is readily apparent that in a mold of this kind the metal must lie absolutely quiet. The least flutter or boiling action will result in a defective area and consequent rejection. In addition to other exacting specifications, the castings must withstand a pressure test.

Fig. 10 shows one of the closed molds with the three crucibles in position. The two crucibles right and left in the foreground provide metal for the greater part of the flat plate. This metal is poured at a temperature of 2150 degrees Fahr. Metal from the third crucible feeds the two cylinders and is poured at a slightly lower temperature, 2050 degrees Fahr. It is estimated that the metal flowing over the wide plate loses approximately 100 degrees in temperature and, therefore, unites uniformly with the metal at the far side in the cylinders. Experience indicates that uniform temperature is an important factor in preventing cracks, draws and other manifestations of shrinkage.

The ladle carriers, built on the premises, deserve special mention. The ladle shank rests on two plungers mounted on spiral springs in upright cylinders. Before pouring commences the crucible is lifted forward and the shank placed in the hooks in front of the carriage. Thus the lip of the crucible may be placed close to the sprue opening of any cope high or low. The supports also hold the crucible steady and relieve the man of the weight. The device is mounted on four caster type wheels and with a full crucible may be maneuvered easily and readily into any desired position by one man.

Manufacturing Right Acquired

Dr. Tracy C. Jarrett, chief metallurgist of the Koppers Co., American Hammered Piston Ring Division, has announced that he has concluded an agreement with the Precision Scientific Co., Chicago, whereby the latter has acquired the sole rights to manufacture and market metallurgical apparatus originally developed by Dr. Jarrett and formerly marketed by him. Dr. Jarrett is to be retained by the Precision company as consulting metallurgist.

Boosts Production of Magnesium Castings

New Jersey foundries of Bendix Aviation Corp. in one month now produce a volume of magnesium castings equal to their entire output of all metal castings in 1939. Anthony Cristello, foundry manager of the corporation's Eclipse-Pioneer division, states the four New Jersey foundries' monthly production of magnesium castings now average nearly 400,000 pounds; increased facilities, which will be available shortly, will boost this total to exceed 8,500,000 pounds annually.

A single day's production of magnesium castings in Bendix foundries now exceeds the total yearly output for 1931, when the corporation first began foundry operations in a small shop of 18,000 square feet, staffed by four employes, at Little Falls, N. J. Bendix now operates foundries in Teterboro, Little Falls, Hawthorne and North Bergen, New Jersey, employing several thousand men and women. Complete mechanization of most foundry operations has contributed considerably to present high volume production. In 1931 magnesium castings represented only 17 per cent of the corporation's foundry output; now half the castings turned out by the four New Jersey foundries are of magnesium.

Issues CMP Booklet

A booklet containing a simplified explanation of the Controlled Materials Plan is being distributed by Manning, Maxwell & Moore, Bridgeport, Conn. Containing 16 pages, it is intended to provide a working knowledge of CMP fundamentals.

KEEP GOGGLES CLEAR!

WITH THE M·S·A
GOGGLE CLEANING STATION

The handy M.S.A. Goggle Cleaning Station encourages your workers to keep goggle lenses clear by conveniently supplying Fogpruf—an effective cleaner and anti-fog preparation, together with Optical Wiping Tissues, in a compact wall-mount dispensing unit.

Fogpruf is sprayed on the lenses by a finger tap; cleaning tissues are pulled from the top of Station, discarded in receptacle below.

Encourage your foundrymen to avoid cloudy or dirty goggle lenses which lead to reduced efficiency. Details in Bulletin CE-20.

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS, AND MEADE STS.
PITTSBURGH, PA.
District Representatives in Principal Cities

INOCULATION OF GRAY IRON

(*Continued from page* 127)

in good order. Variation of the nature of the charges, and the oxygen input, must be controlled so as to yield a product of the desired chemical and physical properties and of the desired degree of superheat. The composition and quantity of the slag are also of concern.

Tapping may be either intermittent or continuous but in either case must be under control. Dry preheated ladles must be provided. Ladle additions of alloys and inoculants must be made according to good practice. It is this subject of ladle inoculation that receives special consideration in this paper. It is a single small, but important, factor in the melting process.

After inoculation, the metal must be transported to the molding section and poured at a temperature suitable to the type of metal and casting.

Control of these variables requires sound engineering knowledge of the effect of the various factors. Air weight meters and controllers, charge weighing devices, pressure meters, pyrometers, and chemical and physical analyses all must be employed in the control procedures.

(c) *Uncontrolled Variables.* The most rigid control being exercised in the modern gray iron foundries today still leaves many variables uncontrolled, but the increasing application of scientific reasoning is bringing to light rapidly new factors contributing to increased knowledge of the behavior of the various factors involved. Present methods of control probably neglect completely the effect of important factors that are not even being considered at the present time. Little is known about the effect of many minor chemical elements in the product iron. Witness the recently developed processes involving the astonishing chill-forming properties of tellurium.[3] How many foundries in the past, with their product under supposedly rigid control, have had their iron inexplicably vary in chill and never even considered tellurium as a contributing factor?

Modern chemical analysis leaves much to be desired in the determination of the manner in which gases, notably oxygen, exist in the melt and the product iron. Without this knowledge, there is another stumbling block on the path to solution of the entire problem.

Much Work To Be Done

Modern physical analysis is better developed but still leaves much work to be done. The recent works on graphite flake size[4] and "cell size" of cast irons are examples of the progress being made in this field.

The variables involved in the manufacture of gray cast iron, the alloys used, the application of the casting, and the applied physical and chemical tests are concerned directly with the establishment of a given structure. The structure of cast iron is composed of (a) graphite flakes and (b) a ferrous matrix. It is the aim and duty of the manufacturer to provide a structure that will withstand successfully the conditions to which the iron will be subjected. Ladle inoculants have been recognized widely as one method of attempting to control this structure.

As reported in this paper, ladle inoculation is considered as that process in which an addition is made to the molten iron, after the iron is tapped from the melting unit, for the purpose of effecting a change in the physical properties of the metal; chemical changes are of secondary consideration. This definition is intended to exclude alloy materials, such as nickel and chromium, that primarily affect chemical composition.

A further condition has been imposed in this paper in that only silicon-bearing (graphitizing-type) inoculants have been investigated. Chromium-bearing (stabilizing-type) inoculants have not been considered.

Ferrosilicon is probably the most widely used inoculant. In many cases, a ferrosilicon addition is made for the purpose of reducing chill in the iron by adjusting the silicon content. In these cases

"It's REALLY tested . . . when it's RIEHLE tested"

Model 505 Universal Hydraulic Testing Machine

For tension, compression, transverse, Brinell hardness testing

Model 505 RIEHLE is the most accurate, economical and reliable testing machine within its group today. It has two motor drives: one for hydraulic loading, and the second for fast vertical adjustment of gripping head and table. The spherically suspended gripping head and table assure consistent accuracy even with loads applied off-center. Capacities up to and including 60,000 pounds. *Write for descriptive literature and quotations.*

ARMY E NAVY

RIEHLE TESTING MACHINES

Division of American Machine and Metals, Inc., East Moline, Illinois

Other Products:

IMPACT TESTERS · VICKERS HARDNESS MACHINES · BRINELL HARDNESS TESTERS · MEASURING INSTRUMENTS

an inoculation is made, and the advantages of inoculation perhaps unwittingly obtained.

Other silicon-bearing inoculants are common. Among these are a prepared form of silicon carbide and a balanced alloy of silicon, manganese, and zirconium. The latter has received special attention in this paper as experience has shown it to yield excellent results. One investigator[5], after testing a large number of inoculants, reported that all of the successful inoculants contained silicon, but that all silicon-bearing inoculants did not give good inoculation.

A patented process has been built around the use of calcium silicide as the inoculant.

Graphite electrodes, powdered graphite, and Mexican graphite have been used as inoculants.[3, 5, 6, 7] Silico-chrome and silico-titanium have been reported to be in use.[8]

Manganese has been suggested as having an indirect graphitizing effect, combining with and nullifying the carbide-stabilizing effect of traces of iron sulfide.[9]

Mechanics of adding inoculants to the ladle have received special attention. Even special mixing spouts have been developed for this purpose.[10] It is agreed generally, however, that the inoculant is added best in the cupola spout as the metal is flowing through the spout; thus thorough mixing of the addition is obtained. Addition of the inoculant to the bottom of an empty ladle permits the inoculant to fuse to the bottom of the ladle and be rendered inefficient. Addition to the top of the metal does not provide for mixing and results in loss through oxidation and air currents.

Use Dry Inoculant

The inoculant should be dry. Therefore, it is an excellent practice to supply the inoculant to the ladle station in a chute located over the cupola spout; thus heat is provided to remove moisture from the addition material, and the addition is preheated.

The time element, also, must be taken into consideration, for the effect of inoculation is known to wear off with time.[3] It is doubtful whether there is any advantage to be obtained by inoculation of a metal that will not be poured completely within 15 minutes,[11] although the time-effect probably varies with different inoculants. Therefore, it is highly desirable, in the case of large ladles that are under the spout for a considerable period of time, to inoculate on the last tap.

The particle size of the inoculant also requires consideration. Powdered and fine materials suffer a considerable loss due to their being blown away by the hot air rising from around the metal. Coarse particles offer less surface for reaction, and even may persist undissolved into the casting, where they will show up as troublesome inhomogeneities. The coarsest particles reported in use are stubs of graphite electrodes that are permitted to float on the metal during the entire pouring process. Such a practice depends upon diffusion for mixing, but also takes care of the time effect in that the inoculant is available continuously. Considerable success has been reported using this electrode inoculant in the manufacture of chilled car wheels.[3]

Effects of ladle inoculation are attributed primarily to the effect of the inoculant upon the graphitic carbon in the iron. The cast iron, graphitic carbon may exist in two principal forms, flake graphite and nodular graphite (temper carbon). The latter form is the most desirable but, insofar as now known, is obtained only by heat treatment, as in the case of malleable iron. Since the average foundry wishes to produce gray iron castings without heat treatment; consideration is limited to the amount, size, shape, and distribution of the particles of flake graphite.

Inoculants are not used generally for control of the amount of graphitic carbon, except in cases where it is used to control chill. The amount of graphitic carbon usually is controlled by adjustment of chemical composition and the control of cooling rate. The main effect of inoculation of gray iron is upon the size, shape, and distribution of the graphite flakes. By controlling the graphite, inoculation also tends to eliminate ferrite "patches" and thus promote development of a uniform pearlitic groundmass.

It has been established by many

Schundler
BENTONITE
AVAILABLE FOR IMMEDIATE SHIPMENT

SCHUNDLER BENTONITE, Fesco Fire Clay, Fesco Bond and other foundry products are sold with a technical service fitted to your requirements . . . a service provided by a large, scientific staff working in a well equipped laboratory.

24 HOUR SERVICE to most Foundry Centers . . .

Akron, Ohio.....H. S. Stoller
Birmingham, Ala.....Foundry Service Co.
Boston, Mass.....Klein-Farris Co., Inc.
Chattanooga, Tenn.....Frank Robbins, Jr.
Chicago, Ill.....B. J. Steelman
Chicago, Ill.....Wehenn Abrasive Co.
Cincinnati, Ohio.....Delhi Foundry Sand Co.
Coldwater, Mich..The Foundries Materials Co.
Detroit, Mich.....The Foundries Materials Co.
Dallas, Texas.....Barada & Page, Inc.
Edwardsville, Ill..Midwest Foundry Supply Co.
Houston, Texas.....Barada & Page, Inc.
Kansas City, Mo.....Barada & Page, Inc.
Long Island City, N.Y..F. E. Schundler & Co., Inc.
Los Angeles, Cal..Independent Fdry. Supply Co.
Milwaukee, Wis.....Thomas H. Gregg
Minneapolis, Minn.....Smith-Sharpe Co.
New Orleans, La.....Barada & Page, Inc.
Oklahoma City, Okla....Barada & Page, Inc.
Philadelphia, Pa..Penn. Fdry. Sup. & Sand Co.
Portland, Ore...Miller & Zehrung Chemical Co.
St. Louis, Mo....Midwest Foundry Supply Co.
Oakland, Cal.....Industrial Supply Co.
Seattle, Wash.....Carl F. Miller & Co.
Toronto, Canada....Muir Foundry Supply Co.
Tulsa, Okla.....Barada & Page Supply Co.
Vancouver, B. C.....Fleck Bros. Limited
Wichita, Kans....Barada & Page Supply Co.
Mexico D.F., Mexico.....N. S. Covacevich

F. E. SCHUNDLER & CO., INC.
520 RAILROAD STREET
JOLIET, ILLINOIS

Schundler

investigators that the effect of the inoculant is to change the graphite from a fine, dendritically oriented pattern to a coarse, randomly oriented pattern.[5, 7, 12, 13, 14, 15, 16] Mahin and Hamilton[4] have proposed a system for the classification of graphite flake size and distribution. Fig. 2 shows the manner in which this system classifies flake patterns by size number and distribution type.

Of the two possible graphite flake formations in cast iron, dendritic and random, the former have low mechanical properties and poor wear and heat resistance. This is because of the continuous nature of the fine graphite. The coarser random-type flakes do not break up the matrix to the same degree, and thus permit the iron to approach more closely the properties of the matrix. This has been established by Flinn and Reese.[5] Recent papers on graphite structure have minimized the value of alloys for the control of graphite size and contend that this effect of alloying has been overstressed.[5]

Graphite flake size is affected by the amount of carbon, the graphitizing factors, and the cooling rate. As the carbon available for flake formation increases, flake size increases. As the cooling time increases (section size becomes larger), larger flakes are produced, in accordance with the normal laws of crystal growth. The cumbersome and complicated Lanz-Perlit process attempts to control graphitization by the use of preheated molds.[17]

Flinn and Reese[5] presented Fig. 1 to illustrate the effect of distribution. In cases 1, 2, and 3; with the same amount of graphite randomly oriented in one, five, or ten flakes; the effect is similar because the amount of unaffected matrix is the same. The fact that distribution is more important than size is shown in case 4 where small flakes are obtained but the distribution is poor. The physical properties of case 4 obviously will fall below those of the randomly oriented, though larger, flakes.

It is held that the mass of evidence showing lower strengths attending large flake sizes merely uses the flake size as an indication of crystal size and cooling rate of the matrix material.[5] The larger grain size, lower combined carbon, and coarser carbides are primarily responsible for the decrease in physical properties associated with coarse graphite flakes.

Effects Not Same

Effects of ladle inoculation are greater in the low carbon ranges than with medium or high carbon. Low carbon irons normally solidify in the fine dendritic (also called *grain boundary* and *eutectiform*) patterns. Therefore, they are greatly improved by ladle inoculation.[1] Irons containing total carbon below 2.50 per cent are particularly responsive to ladle treatment. Medium carbon irons show less improvement on inoculation because of the normal occurrence of random flake graphite, but the effect is still appreciable. However, although the structure of a medium carbon iron may be predominately random graphite, the surface often shows a fine dendritic structure. The effect of inoculation of these irons is to produce a random structure completely through the casting. Naturally, such an effect appreciably increases transverse strength and deflection tests as normally made. In high carbon irons above 3.40 per cent carbon the effects of inoculation on graphite structure are inappreciable because of the fact that the random structure usually persists through the entire casting.

Whereas a 3.00 per cent carbon iron may have its tensile strength increased about 3000 pounds per square inch as a result of inoculation, a 2.30 per cent carbon iron may show an increase of as much as 15,000 pounds per square inch. Eash[12] has shown that the effects of the inoculation of austenitic iron are quite similar to the results obtained with the pearlitic irons. Low carbon austenitic irons showed marked improvement; medium carbon irons showed only moderate improvement. Inoculation changes the fine dendritic structure of the low carbon austenitic irons to the random flake graphite.

Although it has been claimed[18] that conclusive proof of the manner of formation of the different types of graphite has not been given, the differences between fine dendritic flake graphite and

★ ★ ★ SINCE 1911 ★ ★ ★

DEPENDABLE CORE BLOWING EQUIPMENT

DEMMLER NO. 1

This unit designed especially for small core work such as plumbing goods, electrical fittings, stove burners, valves and small pipe fittings. Ideally suited to quantity core production on all types of small brass, malleable, and gray iron work. Detailed specifications on this or other models on request . . . a type and size for every core blowing need.

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS

CORE BLOWERS Exclusively

coarse random flake graphite indicate a basic difference in their mode of formation. Such has been shown by Eash by means of thermal analysis.[7]

Eash[7] showed that inoculated and uninoculated irons actually differ in eutectic temperature. He further developed the fact that the dendritic pattern is the result of a *solid* reaction occurring below the eutectic temperature, and that the random pattern is the product of the *liquid* eutectic reaction. In other words, the random pattern is formed by freezing directly into the iron-graphite system, without carbide as a temporary phase; the dendritic pattern is caused by graphitization in the solid state. Flinn and Reese[8] and Boyles[19] support this statement.

Therefore, the effect of the inoculant is to produce graphitization at the eutectic in those cases where graphitization would occur normally below the eutectic. The inoculation actually changes the method of solidification.

The reasons for the action of inoculants have not been established definitely and, for the purpose of this paper, merely will be summarized.

Give Inoculant Action

(a) *The Graphite Nuclei Theory.* This theory is generally credited to Piwowarsky[14] and is accepted most widely.[3, 7, 15] The graphite nuclei theory states that graphite particles in the melt act as nuclei to accelerate the graphitization phenomenon. One investigator attributes the potent effect of silicon inoculants to a local concentration of silicon; this concentration promoting a shower of fine graphite nuclei in the melt.[20]

The addition of fine graphite to a melt has been shown to change a dendritic pattern to a random pattern.[15]

(b) *The Silicate-slime Theory.* This theory provides for a submicroscopic slime of ferrous silicate inclusions to act as coarse graphite nuclei. The theory is supported by the fact that a slag that removes silicon or ferrous oxide helps to promote fine graphite. Massari and Lindsay[3] point out the analogy between this behavior and the popular belief that submicroscopic inclusions affect grain size in steel. Dierker[9] also supports this theory.

(c) *The Gas Theory.* The gas theory has fewer supporters and attempts to explain the effect of inoculation on the basis of reactions between the inoculant and dissolved gases. Proponents of the idea that inoculation is really deoxidation uphold this theory.[13, 21]

It is a fact that most of the effective graphitizers are also strong deoxidizers. Perhaps inoculation is also deoxidation and the "wearing off" effect is really reoxidation. On the other hand, aluminum is a more powerful deoxidizer than silicon, but still does not produce the same inoculating effect as considerably smaller additions of silicon; whereas chromium, a strong deoxidizer, produces carbides and not graphite.

Two different inoculants were tested in the course of the investigation as follow:

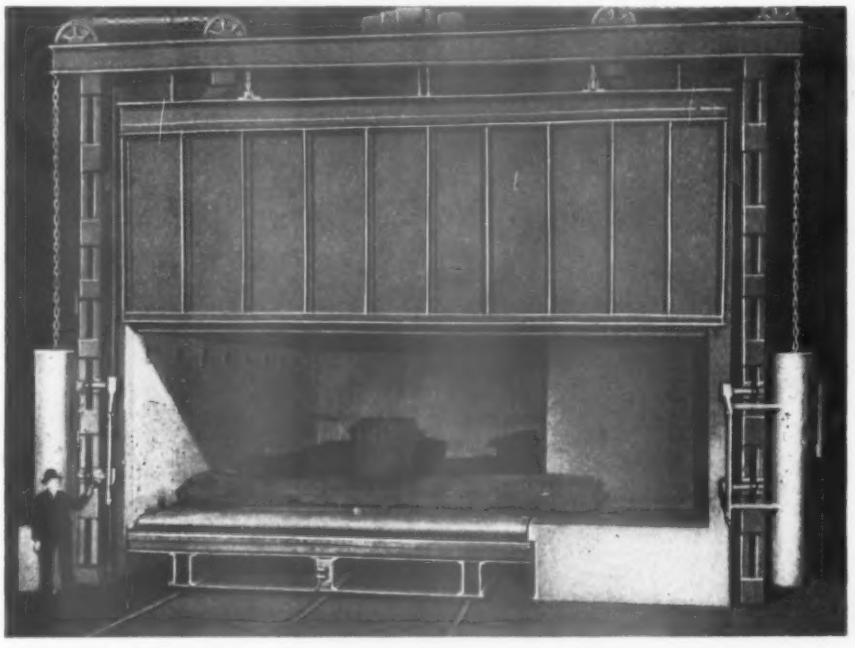
Designation	Description
SiMnZr	A balanced proprietary alloy containing approximately 75 per cent silicon, 7 per cent manganese, and 7 per cent zirconium.
FeSi	Commercial 94 per cent ferrosilicon.

The SiMnZr and FeSi were supplied as coarsely ground materials; sized for the inoculation of all the small test ladles to pass a 6 mesh screen and be retained on an 80 mesh screen.

All of the tests were made on regular production cupola heats. The first experimental work was performed by making carefully measured additions of inoculants to preheated 60-pound hand ladles. Additions were mixed thoroughly by pouring the iron back and forth between two hand ladles before pouring the test pieces. Later work made use of spout additions to larger quantities of metal.

In each series of tests in which the same base iron was used, the base iron was tapped out into a bull ladle. Small amounts of metal were taken from the bull ladle and increments of inoculants added. Test pieces were poured within one minute after inoculation so that the "wearing off" effect of the inoculant was minimized, and was in effect negligible.

Melting was done in a mechanically



VULCAN Car Hearth Furnace

for annealing, normalizing and stress relieving large marine castings, including stern frames and rudder assemblies. Designed to operate over a temperature range from 700°F. to 1800°F. Direct fired, using heavy oil circulated by a unique system that assures proper oil temperature and pressure at each burner. Correct burner placement, wide range burner capacity and accurate furnace pressure control are factors contributing to exceptionally close temperature uniformity. Two-zone control. Motorized car and door.

The furnace illustrated was in operation within 90 days of receipt of order . . . a result made possible by an experienced, closely coordinated organization accustomed to taking big jobs as a matter of course.

Your inquiries for heat treating equipment of any kind will receive the same prompt, efficient attention. Wire, write or phone for Sales Engineer.

VULCAN CORPORATION
1797 CHERRY STREET, PHILADELPHIA, PA.

charged 60-inch cupola equipped with an air weight controller.

All temperature measurements were made by means of an optical pyrometer. Test bars were poured in duplicate or triplicate. The regular transverse tests were made on standard A.S.T.M. 1.2-inch arbitration bars on 18-inch centers.[1] The bars were cast vertically in cores and were permitted to cool at least 4 hours before shaking out the molds.

Tensile tests were made on the broken ends of the transverse bars; brinell hardness readings were obtained immediately adjacent to the transverse break.[1, 22, 23] For the hardness test, a flat area was ground onto the surface of the bar and two or more readings obtained. Notice should be taken of the fact that the reported test bar properties refer to 1.2-inch sections and do not correlate directly with the properties of castings of other section thicknesses.[13, 24, 25] Figs. 4, 5, 6, 7, 8 and 9 show the effect of varying section size upon an inoculated iron containing 3.05 per cent total carbon, 2.01 per cent silicon, 0.88 per cent manganese, 0.114 per cent sulphur, and 0.172 per cent phosphorus.

Chill tests were made vertically in cores; no metal chills were used. The chill specimen was a prism approximately four inches long with a ½-inch by 1-inch triangular base (shown in Fig. 3).

(To be concluded next month)

you should be using these . . . . .

MEXICAN GRAPHITE PRODUCTS

in your foundry

MEXICAN PLUMBAGO

A grade for every kind of mold and requirement.

CORDIP

A prepared core wash for dipping or spraying dry or green sand cores.

NO 8 MEXICAN GRAPHITE

A ladle addition to reduce chill and hardness and to improve machinability.

Try them and be convinced.

THE UNITED STATES GRAPHITE CO.
SAGINAW, MICHIGAN, U.S.A.

Bibliography

1.—American Society for Testing Materials, *ASTM Designation A48-41 Standard Specification for Gray Cast Iron*, (1941).

2.—Lorig, C. H., "Metallurgy of Cast Iron," proposed revision for *Cast Metals Handbook*, Amer. Foundrymen's assn., (1943). (Unpublished as this paper is written.)

3.—Massari, S. C., and Lindsay, R. W., "Some Factors Affecting Graphitizing Behavior of Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 49, p. 953 (1941).

4.—Mahin, W. E., and Hamilton, J. W., "A Proposed Standard Classification of Graphite in Gray Cast Iron." *Proceedings*, Am. Soc. Testing Mats., Part II, vol. 37, p. 52 (1937).

5.—Flinn, R. A., and Reese, D. J., "The Development and Control of Engineering Gray Cast Irons," *Transactions*, Amer. Foundrymen's Assn., vol. 49, p. 559 (1941).

6.—Dierker, A. H., "Ladle Additions of Graphite to Gray Cast Iron," *American Foundryman*, vol. 2, p. 2, November 1940.

7.—Eash, J. T., "The Effect of Ladle Inoculation on the Solidification of Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 49, p. 887 (1942).

8.—Lemoine, R. P., "Cupola High Test Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 42, p. 745 (1934). (French exchange paper.)

9.—Dierker, A. H., "Silicon and Manganese as Deoxidizers in Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 41, p. 469 (1933).

10.—O'Brien, W. A., "Develops Cupola Mixing Spout," THE FOUNDRY, vol. 70, no. 9 (1942).

11.—Crosby, V. A., and Herzig, A. J., "Late Silicon Additions to Cast Iron," THE FOUNDRY, vol. 66, no. 1, (1938).

12.—Eash, J. T., "Effects of Ladle Inoculation on Austenitic Cast Iron," *Transactions*, Amer. Foundrymen's Assn., Preprint 42-38, 1942.

13.—Schneidewind, R., and McElwee, R. G., "The Influences of Composition on the Physical Properties of Gray Irons," *Transactions*. Amer. Foundrymen's Assoc., vol. 47, p. 491 (1939).

14.—Piwowarsky, E., "Progress in the Production of High Test Cast Iron," *Transactions*, Amer. Foundrymen's assn., vol. 34, p. 914 (1926).

15.—Norbury, A. L., and Morgan, E., "Effect of Melting Conditions on the Microstructure and Mechanical Strengths of Gray Cast Irons Containing Various Amounts of Carbon and Silicon, "*Jour. Iron and Steel Institute*, vol. 121, p. 367 (1930).

16.—von Kiel, O., and others, "The Influence of Nonmetallic Nuclei on the Graphite Formation in Cast Iron. Heredity Phenomena in Cast Iron and Their Causes," *Arch. fuer das Eisenhuettenwesen*, vol. 7, p. 579 (1934).

17.—Marbaker, E. E., "High Test Cast Iron —European Developments," *Transactions*, Amer. Foundrymen's Assn., vol. 37, p. 405 (1929).

18.—Epstein, Samuel, *The Alloys of Iron and Carbon*, McGraw-Hill Book Co., Vol. I, p. 115 (1936).

19.—Boyles, Alfred, "The Freezing of Cast Iron," *Transactions*, Amer. Inst. of Mech. Engineers, vol. 125, p. 141 (1937).

20.—Coyle, F. B., and Houston, D. M., "High Strength Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 37, p. 469 (1929).

21.—Sefing, F. G., "The Effect of Varying the Silicon Content of Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 48, p. 161 (1940).

22.—MacKenzie, J. T., "Factors of Mechanism of Testing," *Transactions*, Amer. Foundrymen's Assn., vol. 41, p. 569 (1933).

23.—MacKenzie, J. T., "Factors in the Production of Test Bars," *Transactions*, Amer. Foundrymen's Assn., vol. 41, p. 573 (1933).

24.—MacPherran, R. S., "Correlation of Test Bar and Casting," *Transactions*, Amer. Foundrymen's Assn., vol. 41, p. 565 (1933).

25.—Piwowarsky, E., "Certainty of Results as the Basis for the Manufacture of High Strength Cast Iron," *Transactions*, Amer. Foundrymen's Assn., vol. 42, p. 705 (1934).

26.—Taylor, H. F., and Romanski, E. A., "Measuring the Fluidity of Cast Steel," *American Foundryman*, January 1942.

27.—Roth, E. L., "Sixty Thousand Pound per Square Inch Cupola Iron," *Transactions* Amer. Foundrymen's Assn., vol. 47, p. 873 (1939).

GRAY IRON FOUNDERS' MEETING

(*Continued from page* 113)

ing throughout the industry.

Highlighting the manpower discussions was an address by Brig. Gen. William C. Rose, chief, Executive Services, War Manpower Commission. Pointing out that 2,000,000 more industrial workers will be needed the next 6 months, plus the additional men and women required to replace those taken from industry by selective service, he stated that most of this demand must be met by transfers from less essential industries. The problem is intensified further, he indicated, by the likelihood that harder fighting in the future will call for greater replacements in the armed forces. Normal replacements, exclusive of battle casualties, already require 500,000 to 600,000 additional men annually, and this need can barely be filled by those just reaching draft age.

General Rose stated that preferential treatment will be accorded an industry or units of an industry in the matter of labor supply when conditions warrant. He added that while unskilled labor is not classified as deferrable, selective service boards have been instructed to give consideration to essential industries and to individual plants when it can be demonstrated that unusual hardship and serious interruption to vital war production would result from the drafting of such workers. He also stated that in the reclassifying of fathers, those in nondeferrable industries and work classifications will be taken first.

Makes Sharp Criticism

Sharp criticism of the War Manpower Commission's actions with respect to the foundry industry was voiced by Senator James E. Murray of Montana at a luncheon meeting. He scored the commission for riddling the ranks of foundry workers which, he declared, has necessitated the hiring of young boys, and said that WMC should have understood the circumstances surrounding the need for an adequate supply of workers and taken steps to avert a slow-down in essential war production. The senator was equally critical of OPA, holding that gray iron foundries should not be limited to the maximum prices now in effect because costs have risen since the base period on which these ceilings are predicated.

Senator Murray, who is chairman of the committee studying problems of small business, also indicated that big business is favored in war contracts and is growing rich while small industry is discriminated against; that cartels and business monopolies have had an important influence in causing the war; that business concentration has fostered bureaucracy in government; and that no manpower crisis would have resulted if small business had received an adequate volume of contracts in the early stages of the war production program.

Speaking at the Wednesday luncheon, Frank W. Boykin, representative in Congress from Alabama, declared that there still is a serious shortage of steel—almost 25,000,000 tons on an annual basis. This figure represents the excess of the requests by the various government claimant agencies for steel for war needs over actual production. Chairman of the House committee which has been investigating the steel shortage situation for the past 14 months, and a strong advocate of the building of sponge iron plants, Mr. Boykin said that part of the alleged shortage could be overcome if gray iron castings were substituted for rolled steel to the fullest practicable extent. Although WPB has indicated that the steel supply problem in general has been licked, Mr. Boykin stated that the work of his investigating committee would be continued.

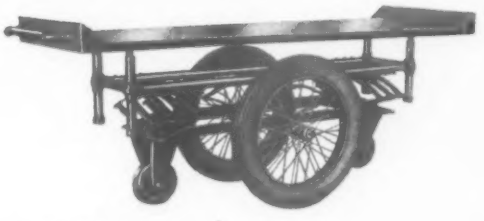
The fifteenth annual meeting was opened Tuesday morning by President A. C. Denison, who expressed pleasure and gratification on the splendid attendance.

The first session was devoted to a savings forum on "The High Cost of Inefficiency" with E. L. Roth, president,

CMD

PNEUMATIC CORE TRUCKS

Minimize Chafing and Breakage of Cores



Type A-27 has a bench high steel loading tray and is made in three sizes with load capacities of 1,000 lbs., 1,200 lbs. and 1,400 lbs.

An exclusive coil spring in each upright support together with pneumatic tires makes CMD Pneumatic Core Trucks first choice of foundries for efficient handling of cores. 4 styles of trucks are available. Write for free circular on the complete CMD line.

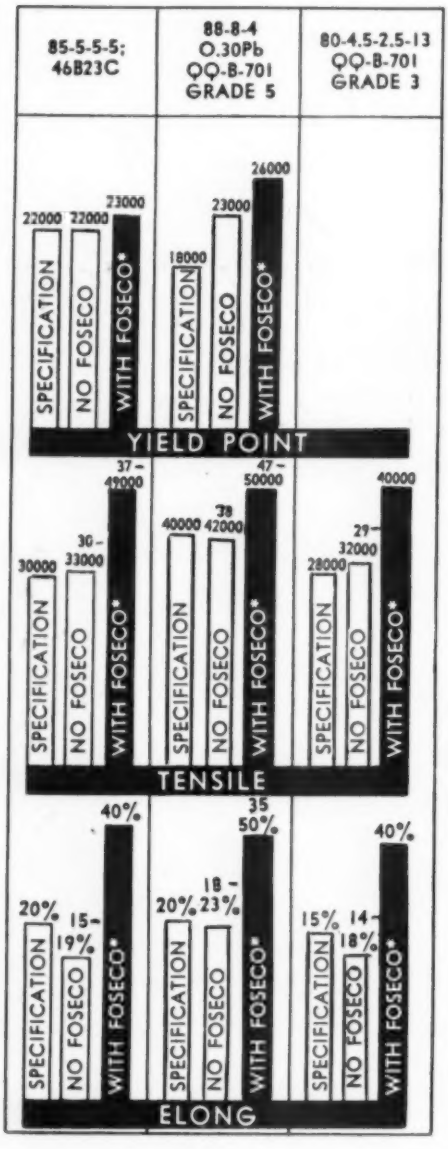
CHICAGO MANUFACTURING & DISTRIBUTING CO.
Dept. 11F, 1928 W. 46th St., Chicago 9, Ill.
Please send your free folder on the CMD line of Pneumatic Core Trucks and other foundry specialties.

Name..... Position.....
Company.....
Address.....
City..... State.....

Manufacturers of a complete line of flasks, core-conveying equipment and foundry specialties.

Figures Prove Facts!

. . . and here are the figures to *prove* FOSECO products make better castings. Leading foundries report these results obtained on bronze alloys in ordinary practice and when using FOSECO R6:



*FOSECO R6

See for yourself how FOSECO R6 and other FOSECO products make *better* castings—whatever alloy you are using. For sample, write, stating alloy you are casting.

FOUNDRY SERVICES, *INC.*
280 Madison Avenue
New York, N. Y.

Motor Castings Co., Milwaukee, presiding. H. P. Mueller, general manager, Century Foundry, St. Louis, presented the first discussion on the subject of "Capital Investment and a Mechanized Foundry." The speaker outlined the problems which have confronted a large captive foundry built about 15 years ago at a total investment of about $1,000,000. While the foundry was built to produce some 700 tons of gray iron castings per month for use of that company, business conditions were slow for a good portion of the time since the plant was built and outside markets were tapped. Mr. Mueller pointed out that results of this move were none too good, for it is as bad practice to take business at the other fellows prices as it is to cut prices. The plant was fully mechanized.

Mr. Mueller stated that a foundry with an investment of a million dollars located in a large city has a little more trouble trying to earn a profit on the investment than one which may be located in a small town and has a lesser capital structure. But in recent months changes have been made. The plant now has become a glorified mechanized jobbing shop, specialized in castings that can be produced from one type of iron. The speaker pointed out that to operate a mechanized foundry, it is necessary to have everything that goes with it, including sufficient long-running orders, suitable pattern equipment, suitable flask equipment, plenty of compressed air, tumblers, blasting equipment, a good machine shop for maintenance, wood and metal pattern makers, core blowers for small work, etc.

Advocates Cost System

In conclusion, Mr. Mueller stated that both advantages and disadvantages of a highly mechanized foundry are cared for if a proper cost system is in use. Every job going through the plant should carry a cost card. Regardless of the number of times the order may come into the shop, costs should be kept and compared with previous experiences. The speaker indicated that by doing this the foundryman will find out the variations in production, efficiency of various molders, and that the knowledge gained will pay dividends under today's conditions.

Frank J. Dost, superintendent, Sterling Foundry Co., Wellington, O., presented the second discussion on "Maintenance of Equipment." Mr. Dost stated that while normally the purpose of plant and equipment maintenance is to keep building and equipment in operating condition, this field has a more far reaching function today. Every piece of equipment or machinery that can be kept operating through the application of necessary care means less replacements, and thus the saving of critical materials needed for war uses.

The maintenance department should endeavor to anticipate and prevent interruptions in operation with consequent loss in production. Organization of the maintenance department varies widely with the size of plant and the scope of work which falls under its jurisdiction.

MELTING

"ALNOR"
Pyro-Lance
A RELIABLE PYROMETER

• A long-time foundry-favorite. Gives accurate readings and will stand up under the hard usage of furnace room and pouring floor.

Shock-resisting movement is one of its many features. Is self-contained and uses the enclosed couple, gets true temperature readings below the surface and outlasts bare-wire styles for Brass, Bronze and Copper.

HEAT TREATING

"ALNOR"
RECTANGULAR INDICATING PYROMETER

• An indicating pyrometer with a long scale for high accuracy. Ideal for use with heat-treating furnaces, ovens, and operations where permanent accuracy, rugged construction and close readings are essential.

BLOWER SYSTEMS

"ALNOR"
VELOMETER

• This all-purpose velocity meter indicates air velocities directly and instantaneously on the scale if f.p.m. without the necessity of timing or mathematical calculation.

CHECKS YOUR EXHAUST SYSTEMS
Write us for descriptive folders and prices.

ILLINOIS TESTING LABORATORIES, INC.
418 N. LaSalle Street • Chicago, Illinois

In foundries of the 500 to 600 employe size, the maintenance department usually is divided into three groups, namely electrical, mechanical and building activities. In smaller companies various maintenance foremen, such as millwright, plumbing, electrical, mechanical, etc., report to a master mechanic. In these instances, maintenance functions will be restricted to repairs, inspections and making minor changes and installations.

The speaker then outlined in some detail the various time intervals for such items as buildings, roofs, electrical power transmission equipment, power control, heating equipment, protection equipment and the various items of direct foundry equipment.

"Housekeeping", was the subject of the third discussion presented by C. J. Miller, president, Fremont Foundry Co., Fremont, O., and a past president of the society. Mr. Miller indicated that it is harder to keep a jobbing foundry tidy than a production foundry. Frequently the desire for a clean foundry goes back to early training, and the man who has been trained in the need for cleanliness and order will endeavor to keep the plant clean.

Need Good Floors

The speaker stressed the value of good floors in any plant and stated that without good floors, it is impossible to keep the place clean. In his own plant, Mr. Miller stated that he has saved about 10 per cent of the cost of the night crew by surfacing his floors with concrete. Good floors improve conditions for cutting the sand, and at his plant make it possible to haul out the castings faster. Mr. Miller stated that he also recently had installed a knockout unit which speeds the cleaning of castings and results in a saving of such materials as wire rods and scrap materials. The speaker also emphasized the importance of keeping slag wood from floating around the foundry by putting a cover on the slag spout.

The final discussion at the morning session pertained to "Savings To Be Effected in Cupola Operation", and was presented by John Lowe, Battelle Memorial Institute, Columbus, O. The speaker stated that there was plenty of room to effect savings in the majority of foundries operating cupolas. This idea of saving should be considered not only in terms of labor, equipment and fuel, but also in terms of consistent and improved quality of cast iron.

A cupola melting unit should be designed so that it is easily manned, readily kept clean, and economically operated, according to Mr. Lowe. In charging, material should be segregated, charges should be weighed accurately and should be kept at the proper height. Coke should be weighed accurately and should be handled in such a way to provide minimum breakage. Blowing equipment should be housed in a clean room, with filters provided at the air intakes. Blast pipe leaks should be minimized. Slag should be removed by mechanical

ALUMINUM

TRADE EY-BARS MARK

BEST FOR STEEL

STANDARD SIZES

2-lb. 8-lb.
3-lb. 10-lb.
5-lb. 12-lb.

Special Sizes to Order

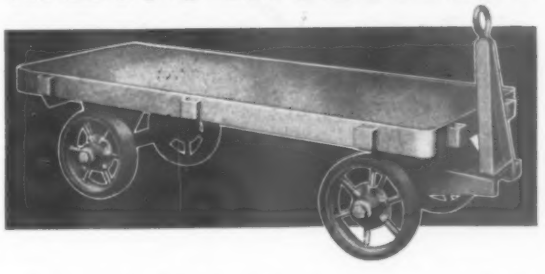
Made Only by

THE CLEVELAND ELECTRO METALS CO.

CLEVELAND, OHIO

Handle Materials FASTER- EASIER- SAFER-

on EWC Industrial Trailers!



2 & 3 Ton Capacities
Steel Decks

These fifth-wheel-type Trailers are designed for general interplant and yard hauling with industrial tractors. Sturdily constructed, scientifically engineered, and backed by our more than 50 years of experience, EWC Trailers are serving industry everywhere—moving materials more efficiently to speed production and distribution.
Let us work with you. Write for Bulletins, Prices, and Helpful Suggestions applying to your own special needs.

EWC WHEELS

Electric Wheel Co., Dept. F, Quincy, Ill.

Have you tried No. 90 Iron Oxide in your core sand mix? Grey iron and steel foundries everywhere are discovering that the inexpensive addition of No. 90 prevents core burning, veining, and penetration. No. 90 Iron Oxide added to the extent of only 2% to your regular core sand mix does the trick! A well known foundry says, "It is every bit as satisfactory . . . as some of the proprietory materials sold at a much higher price." No. 90 not only improves castings, but cuts cleaning costs and speeds production!

Write for Sample Today!

TAMASTONE

The Perfect Pattern Compound

Did you know TAMASTONE speeds production in some foundries as much as 400%—cuts costs 75%? Did you know TAMASTONE converts loose and metal gated patterns into one or more match plates that are good for thousands of impressions, and gives Micrometer accuracy on separate cope and drag patterns? Order now!

TAMMS No. 100
Core Box Cleaner

Why waste valuable time scouring and scraping metal core boxes, drier plates, blow plates, core vents, etc., when it's so easy to "SOAK 'EM CLEAN" with TAMMS No. 100 "Liquid" CORE BOX CLEANER. A solution mixed with water is sufficient to do the job. It's fast acting—thorough! Won't harm metal! Write for prices, NOW!

TAMMS SILICA COMPANY, 228-F N. LASALLE, CHICAGO 1, ILL.

DIRECT PRESSURE CABINET—Recommended for blast cleaning castings, forgings, heat-treated parts or wherever quick action is a necessity. Abrasive elevator system delivers cleaned abrasive to nozzle automatically. Cabinet size shown is 72" x 36". Other sizes available, including one with 60" rotary table. Write for bulletin 32-A.

• • •

Also manufacturers of Welding Fume Collectors, Abrasive Handling Systems, Cloth Dust Filters, Blast Rooms, and accessories.

RUEMELIN MFG. CO., 3850 N. Palmer St.
Milwaukee 12, Wisconsin

RUEMELIN BLAST CABINETS

means and should not be allowed to run on the floor.

All raw materials entering the plant should be given a rigid inspection. Constant watch should be kept for tramp materials, such as aluminum, brass, bronze and tin plate. Competent supervision should be provided for the cupola. Mr. Lowe stated in closing that an incentive plan based on quality of iron, quantity of iron, and melting delays, very effectively encourages and maintains savings in the melting operation.

A forum on casting sales at the Tuesday afternoon session was presided over by Edward C. Hoenicke, assistant to the general manager, foundry division, Eaton Mfg. Co., Detroit. In discussing the determination and development of gray iron markets, H. L. Creps, sales engineer, Frank Foundries Corp., Moline, Ill., urged foundrymen to recognize the necessity of paving the way today for postwar sales. Too many foundries, he declared, have made no organized study of market conditions and sales possibilities in their respective territories. Among his recommendations were: Elimination of sales cycles by a diversification of casting work; determination of the most desirable work for the particular plant being considered, and institution of an accurate cost system.

Alternates Suggested

Specialization in types of iron produced or in special service rendered customers was suggested by the speaker as the preferred alternate to selling only on a price basis. They gray iron industry must overcome the attitude that there is just so much business available and that sales will rise and decline only with the general business cycle, Mr. Creps declared. "It is the nature of American people to want better products at cheaper prices. This characteristic invites the entire industry to survey and analyze the manufacturing field to advance the use of gray iron to its fullest limits."

The importance of training foundry salesmen to act in an advisory capacity from the standpoint of the design and application of gray iron as an engineering material was stressed by C. R. Culling, president, Carondelet Foundry Co., St. Louis in a talk on this subject. He described the 2½-year course of training instituted by his company in the development of what it terms a "foundry products engineer." Candidates are young men with university education in engineering and are given the following practical foundry course:

Three months in the coremaking department—mixing sand, pasting, fitting and preparing cores for foundry use. Three months as molders' helper on the crane floor. Three months on a squeezer molding machine. Two months in the cleaning room, sorting, grinding and blasting. Two months in the heat treating department—packing, loading and becoming familiar with various heat treating cycles. Two months in the pattern and carpenter shop—working on flasks, jackets, etc. Six months with

the pattern clerk and trimming clerk—picking up patterns in the foundry, tagging patterns and core boxes for production, weighing and recording castings for payroll and cost records. Six months on cost records—comparing actual cost records of individual jobs with estimates, figuring casting weighs from blueprints and learning in detail the application of the cost system.

Trainees are paid the going scale, and the cost actually is very small considering the results obtained, according to Mr. Culling. He added that in his opinion the plan has so much promise that any jobbing foundry, large or small, can make it pay.

Henry S. Washburn, president, the Plainville Casting Co., Plainville, Conn., in a talk on "Gray Iron Has Sales Appeal" emphasized that there need be no occasion for alarm over the competitive threat of the newer materials, providing foundrymen take proper steps. "With the sales appeal that gray iron should have for us, its producers, due to its performance during the centuries, due to the modern methods we have of controlling its quality, and due to the fundamental need for it in every walk of life, this is no time for the 'jitters'," he declared. "We have every reason to face the future with more confidence than at any time in the past."

Must Be Sold on Product

However, Mr. Washburn pointed out the necessity for the foundryman himself to be sold on the fact that his products are pre-eminently suited to various and many applications. "We know that gray iron has rigidity, that no competitive material can be machined with the same facility, that no competitive material will provide as satisfactory a wearing surface, that no competitive material has a similar characteristic of damping out vibration. Gray iron can be normalized, annealed, heat treated, flame hardened, chilled. We can furnish an open-grained or a close-grained iron. We can meet a requirement up to 50,000 pounds tensile strength, and many foundries will better that figure considerably.

"The forward-looking foundryman knows that we have only scratched the surface of results to be obtained by the proper combination of carbon, silicon and alloys. Out of all this, if we cannot meet the requirements for a particular job, then it is far better to acknowledge that fact and keep trying. The foundry that knowingly obligates itself to meet certain specifications which are beyond its own capabilities is doing itself and the industry a real harm."

A strong plea for the gray iron foundry industry to awaken to the value of advertising and publicity in the development of markets was voiced by L. J. Wischerath, advertising director, Buffalo Foundry & Machine Co., Buffalo. The job primarily is one for the industry, rather than individual foundries, to undertake, he asserted in pointing out that a sizable sum for promotional pur-

Send For a FREE SAMPLE

of this very efficient product!

Though a large part of the country's foundries use Shelton Metallic Filler to repair gas pockets, blow holes and other blemishes in castings, there are still some who do not. If you are unacquainted with it, write us on your company letter head and we will send you a working sample free.

Shelton Metallic Filler, a quick-dry, air-setting cement, forms a hard, flint-like fill which unites firmly with the wall of the casting. When dressed off, it closely resembles the adjacent area. A dependable product with a long, successful service record. Available at foundry and mill supply jobbers in 1, 5, 25 and 100 lb. containers.

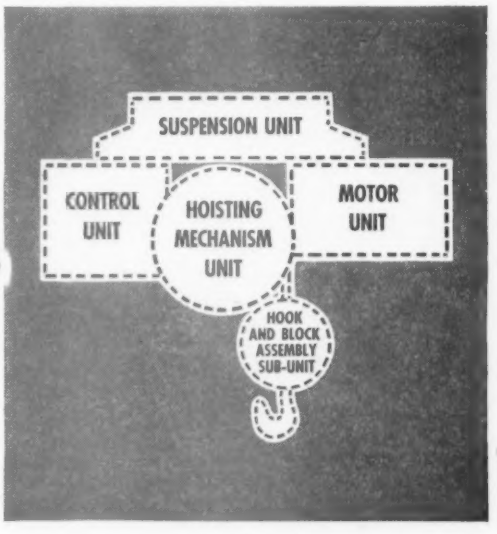
SHELTON METALLIC FILLER

A HARD-SETTING METALLIC CEMENT FOR FILLING IMPERFECTIONS IN CASTINGS.

PRODUCT OF

AMERICAN CRUCIBLE COMPANY, Shelton, Conn.

How to get any of **144 Different Electric Hoists in One!**



This booklet gives you details of the Reading Unit Construction Plan for special hoist equipment at standard equipment cost.

• With the Reading Unit Construction Plan, all electric hoists are composed of four interchangeable units: 1. Suspension Unit; 2. Hoisting Unit; 3. Motor Unit and 4. Control Unit. Combining these *standard* units in various ways gives 144 different hoists—each designed to do a specific job, and each purchased at standard equipment cost.

• A note on your company letterhead will bring you a copy of MODERN MATERIALS HANDLING MAGIC to show you just how the Reading Unit Construction Plan works.

Reading Chain & Block Corporation, 2108 Adams St., Reading, Pa.

READING CHAIN HOISTS·ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

1905 **Strand** 1943
FLEXIBLE SHAFTS

FLEXIBLE SHAFT MACHINES
OF HIGH QUALITY
SIXTY TYPES AND SIZES

THREE SPEEDS VERTICAL ¼ to 1½ H.P.

ROTARY FILES

HEAVY TYPES FOR THE FOUNDRY

ROTARY CUTTERS

MACHINES FOR METAL PATTERN MAKERS

Send for Our Catalog

N. A. STRAND AND COMPANY
5001 NO. WOLCOTT AVE. CHICAGO 40, ILLINOIS

How to *Muzzle* Your Nozzle Costs

DECREASED nozzle efficiency, due to rapid wear in the bore of a short-lived nozzle, wastes costly compressed air and increases power costs to say nothing of the increased cleaning time required. When a 3/8" nozzle bore enlarges only 1/16" at 80 lbs. pressure, power cost goes up $1.10 in 8 hours (based on 1c per H.P. hour).

To muzzle these costly conditions, we recommend the use of low-cost A-H Long-Lyfe Nozzles. A ceramic insert of nearly diamond hardness gives them a service life obtainable only in nozzles costing two to five times more. Used by prominent foundries everywhere. Write for Bulletin No. 17.

$8.00
f.o.b. Factory
(for ¾" size and under)
PATENTED
U. S. Pat. 2,278,442
Canadian Pat. 491,068

American
FOUNDRY EQUIPMENT CO.
505 SOUTH BYRKIT STREET MISHAWAKA, INDIANA

poses would be created if only one-hundredth of 1 per cent of total gray iron sales were set aside for that purpose. Many large industries appropriate 3 to 3½ per cent of the value of sales for advertising and publicity, he added. Mr. Wischerath explained the difference between advertising and publicity and that both are desirable. He also urged that any educational program that is instituted on gray iron be designed to reach the instructors of colleges and universities.

W. B. Crawford, president, Atlas Foundry Co., Detroit, discussed "Price Marketing and Price Policy" and recommended the adoption of a sounder price policy through an adequate cost system. His advice was to make the best castings possible but to have the courage to charge what they are worth. Too many cost items have been neglected in the past by foundrymen, he pointed out, consequently the industry is at least partly to blame if its prices have been frozen by the government at too low levels.

Too Much Guesswork

President Denison was chairman of the Wednesday morning session, which was opened by a talk on "Sound Costing, the Basis of Gray Iron Prosperity," by John L. Carter, cost consultant of the Gray Iron Founders Society. Poor business management is responsible for the low profits experienced in average years by the gray iron industry, according to Mr. Carter. Figures compiled through an OPA survey indicate the industry's profits in 1936 to 1939 were only 4 per cent, and one-fourth of the companies operated at a loss. Inadequate methods of arriving at costs largely caused this condition, he asserted. Probably 1500 foundries are basing their prices on either guesswork or on incorrect cost estimates.

Mr. Carter pointed out that an effective cost system not only provides a sound basis for setting prices, but it also leads to lower costs by indicating where opportunities for cost reductions exist. With sharper competition in prospect after the war there is a crying need for universal adherence to sound cost methods and for close control over costs before that period arrives, he stated.

An estimate of the postwar distribution of workers was presented by D. H. Davenport, chief, Employment and Occupational Outlook Branch, Bureau of Labor Statistics, United States Department of Labor, Washington, in a talk on "Postwar Outlook in Manufacturing." The bureau estimates that by next January the armed forces will include 10,800,000 individuals; 1,000,000 will be unemployed; 13,300,000 will be associated with war agencies and employed in war plants; 8,700,000 will be engaged by agriculture, and 28,500,000 will be in other occupations, largely of a civilian nature. During the 2 years after the war a net withdrawal of 5,000,000 workers from industry is ex-

Take Your CHOICE for cleaner CASTINGS

✓ AVON NON-SILICA PARTING
white

✓ CLIFTON NON-SILICA PARTING
tan

✓ OKAY NON-SILICA PARTING
pink

✓ BUCKEYE TRIPOLI PARTING

•

Our Controlled Manufacturing Process Guarantees Uniformity

EVERY BARREL UNIFORM IN QUALITY

If YOU want perfect lifts and draws, no patching of molds, higher output and lower production costs—take your choice of these favorite partings.

If YOU want clean, faultless castings that are pattern-true, with every line, curve and angle conforming precisely to the pattern, write to us for details!

The
BUCKEYE PRODUCTS COMPANY
7022-24 Vine Street, Cincinnati, Ohio
Manufacturers of
Foundry Supplies, Core Oils, Refractory Cements, Foundry and Equipment Facings

pected. The speaker said it was the duty of industry to co-operate with groups engaged in postwar planning in order that heavy production may absorb the workers released by the termination of war goods output. He also warned that the war's end will not eliminate the danger of inflation, pointing to the experience of 1919 and 1920, and that labor troubles will ensue if living costs are not kept under control.

Discussing postwar labor relation, Dr. Leo Wolman, Columbia University, New York, emphasized the necessity for management, workers and government to accept the fundamental principle that a community of interest exists in the welfare of all three groups. Certain requirements must be met to improve relations after the war, he declared. These he listed as follows:

1. Government must reconsider its position in labor relations and must recognize it is not its function to become an organizer of labor—an auxiliary of the trade union movement.

2. No democratic government can distribute rights to any group without exacting some controls and standards of conduct. These latter must be provided.

3. Equality in administration of the Wagner act.

4. Removal of the barrier between employer and employe which prohibits the former from discussing labor subjects with workers.

Book Review

Micromeritics, the Technology of Fine Particles, by J. M. Dallavalle, cloth, 428 pages, 6 x 9 inches, published by Pitman Publishing Corp., New York, price $8.50.

Behavior and characteristics of small particles has a considerable effect on industrial health, and production, packaging for overseas and domestic shipment, investigation of dust storm problems, and processing and handling of fine particled substances. While considerable information has been available, it was widely scattered, and the author has performed a worthwhile work in gathering it together and presenting it in useful form.

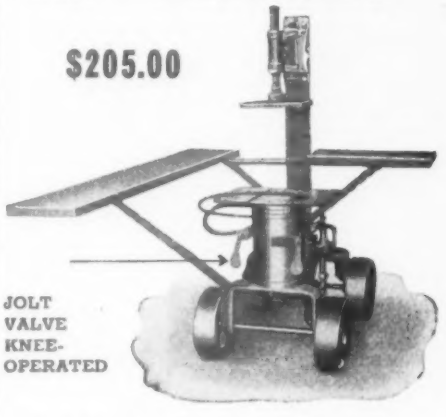
The book is divided into 18 chapters and an extensive bibliography. The first three chapters comprise an introduction, dynamics of small particles and size and size-distribution of particles. Chapters 4 to 8 deal with methods of particle-size measurement, theory of sieving and grading of materials, characteristics of packings, electrical, optical and sonic properties, and thermodynamics of particles. The next six are concerned with chemical properties of small properties, flow of fluids through packings, infiltration and particle-moisture relationships, capillarity, determination of particle surface, and muds and slurries. Remaining chapters relate to transport of particles, theory of fine grinding, collection and separation of particulate matter from air, and atmospheric and industrial dust.

IMMEDIATE DELIVERY
on the
NEW
"RAPID" HAND SQUEEZER
$122.00

Will handle a lot of your bench jobs and save you money by trebling your production.
Handles flasks up to 16 x 30 inches.
Comes complete with benches.
Portable or Stationary Type.

★

"RAPID" R9X JOLT
30% increased jolt capacity
$205.00



A Foundry producer of good molds for over 20 years.
Simple to operate.
Squeeze Plate quickly adjusted.
Low initial cost.

★

Write for NEW descriptive folders and Price Lists.

PIONEER
MANUFACTURING CO.
Molding Machine Manufacturer for Over 20 Years
MILWAUKEE (West Allis) WISC.

◆ ◆ WHERE-TO-BUY ◆ ◆

The following classified list of advertisers according to products is conducted for the convenience of our readers in quickly locating sources of all types of foundry equipment and supplies. If you are seeking information on any product not listed in this directory, a letter or post card addressed to THE FOUNDRY, Penton Building, Cleveland, will bring you this information by return mail.

ABRASIVE (Bricks and Files)
Abrasive Co., Div. of Simonds Saw & Steel Co., Tacony & Fraley Sts., Philadelphia, Pa.
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Cortland Grinding Wheels Corp., Chester, Mass.
Macklin Co., Jackson, Mich.
Norton Co., Worcester, Mass.
Safety Grinding Wheel & Mach. Co., Springfield, O.
Simonds Worden White Co., Dayton, O.
Sterling Grinding Wheel Co., Tiffin, O.

ABRASIVE CLOTH and PAPER
Behr-Manning Div. of Norton Co., Worcester, Mass.
Carborundum Co., Niagara Falls, N. Y.

ABRASIVE (Metallic)—See SHOT and GRIT

ABRASIVE WHEELS
Abrasive Co., Div. of Simonds Saw & Steel Co., Tacony & Fraley Sts., Philadelphia, Pa.
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Cortland Grinding Wheels Corp., Chester, Mass.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Macklin Company, Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., 77 Townsend St., Passaic, N. J.
Norton Company, Worcester, Mass.
Safety Grinding Wheel & Mach. Co., Springfield O.
Simonds Worden White Co., Dayton, O.
Sterling Grinding Wheel Co., Tiffin, O
West Co., Inc., 1117 Shackamaxon St., Philadelphia, Pa.

ABRASIVE CUTOFF MACHINES
De Walt Products Corp., Lancaster, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.
Tannewitz Works, Grand Rapids, Mich.

ACETYLENE GENERATORS
Sight Feed Generator Co., Richmond, Ind.

AFTERCOOLERS (Compressed Air)
Johnson Corporation, Three Rivers, Mich.

AIR COMPRESSORS
Campbell-Hausfeld Co., Harrison, O.
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.
Fuller Company, Catasaqua, Pa.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.
Schramm Inc., 800 N. Garfield Ave., West Chester, Pa.
Sullivan Machinery Co., Michigan City, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

AIR CONDITIONING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co. 505 S. Byrkit St., Mishawaka, Ind.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.
Parsons Engineering Corp., Cleveland, O.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York.
Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

BELTING (Conveyor, Elevator)
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago, Ill.

BELTS (Power Transmission)
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago, Ill.

AIR CONTROL EQUIPMENT
Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago, Ill.
American Air Filter Co., 266 Central Ave., Louisville, Ky.
Foxboro Co., Foxboro, Mass.
Jas. A. Murphy & Co., Hamilton, Ohio.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York

AIRLESS BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

ALLOYS
American-British Chemical Inc., 180 Madison Ave., New York.
American Smelting & Refining Co., 120 Broadway, New York
Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Globe Iron Co., Jackson, Ohio.
International Nickel Co. Inc., 67 Wall St., New York City.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo, N. Y.
Molybdenum Corporation of America, Pittsburgh, Pa.
Ohio Ferro-Alloys Corp., Canton, O.

ALLOYS (Ferro)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Hickman-Williams & Co., Union Trust Bldg., Cleveland, O.

ALUMINUM and ALUMINUM ALLOYS
Aluminum & Magnesium Inc., Sandusky, O.
Apex Smelting Co., Chicago, Ill.
Cleveland Electro Metals Co., Cleveland, O.
Federated Metals Div., American Smelting & Ref. Co., New York City.
General Smelting Co., Philadelphia, Pa.
Jobbins, Wm. F., Inc., Aurora, Ill.
Lavin & Sons, R., Inc., Chicago, Ill.
National Smelting Co., Cleveland, O.
Niagara Falls Smelting & Ref. Co., Buffalo, N. Y.
Sonken-Galamba Corp., Kansas City, Kan.
U. S. Metals Refining Co., New York.
U. S. Reduction Co., E. Chicago, Ind.

ALUMINUM INGOTS
Bohn Aluminum & Brass Corp., 1300 Lafayette Bldg., Detroit, Mich.
Cleveland Electro Metals Co., West 30th St. & NP RR, Cleveland, O.

ANNEALING FURNACES (Electric)
General Electric Co., Schenectady, N. Y.

ANNEALING FURNACES (Gas and Oil)
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.

ANNEALING POT RAPPERS
New Haven Vibrator Co., 131 Chestnut St. New Haven, Conn.

APPRAISALS & SURVEYS
Walter Giele Co., First Natnl. Bank Bldg., Lebanon, Pa.

AREATORS
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.

ARRESTORS (Dust)
American Foundry Equipment Co., 505 Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.

ASSOCIATIONS
Aluminum Research Institute, Chicago, Ill.
Crucible Manufacturers Association, 90 West street, New York, N. Y.

AXLES
Electric Wheel Co., Quincy, Ill.

BADGES (Identification)
St. Louis Button Co., 415 Lucas Ave., St. Louis, Mo.

BANDS (Snap Flask)
Adams Co., 700 Foster St., Dubuque, Ia.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

BAND SAWS (High Speed)
Tannewitz Works, Grand Rapids, Mich.

BAND SAWS (Variable Speed)
Tannewitz Works, Grand Rapids, Mich.

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland, O.

BEARINGS (Anti-Friction, Roller and Ball)
Link Belt Co., 519 N. Holmes Ave., Indianapolis, Ind.

BENTONITE
American Colloid Co., 363 W. Superior St., Chicago, Ill.
Eastern Clay Products, Inc., Elfort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia, Pa.
F. E. Schundler & Co. Inc., 320 Railroad Ave., Joliet, Ill.

BINS (Storage)
American Bridge Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Neff & Fry, Camden, O.

BLACKING (Mold, Core)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Frederic B. Stevens, Inc., Detroit, Mich.
J. S. McCormick Co., 25th St. & A. V. R. R., Pittsburgh, Pa.
United States Graphite Co., Saginaw, Mich.

BLASTING EQUIPMENT
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

BLAST METERS
Foxboro Co., Foxboro, Mass.

BLOWERS
American Air Filter Co., 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co. 5535 N. Wolcott Ave., Chicago, Ill.
General Blower Co., 406 N. Peoria St., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.
Mahr Manufacturing Co., Div. Diamond Iron Works Inc., Dept. F-10, Minneapolis, Minn.
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co. 300 W. Adams St., Chicago, Ill.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

BOLTS AND NUTS
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland, O.

BOND CLAY
American Colloid Co., 363 W. Superior St., Chicago, Ill.

BOND CLAY (Cont'd.)
Eastern Clay Products Inc., Elfort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Ironton Fire Brick Co., Ironton, O.
Lawrence Clay Co., Jackson, O.
F. E. Schundler & Co. Inc., 320 Railroad Ave., Joliet, Ill.

BOOKS (Technical)
Penton Publishing Co., 1213 West 3rd St., Cleveland, O.

BOTTOM PLATES AND BOARDS
Adams Co., 700 Foster St., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.
Wadsworth Core Machine & Equip. Co., Akron, O.

BOWLS and SHANKS
Industrial Equipment Co., Minster, O.

BOXES (Tote)
Penn Iron Works, Reading, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

BRAKES (Magnetic)
Stearns Magnetic Mfg. Co. 662 S. 28th St. Milwaukee, Wis.

BRICK (Refractory)
Carborundum Co., Niagara Falls, N. Y.
Haws Refractories Co. Johnstown, Pa.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester, Mass
Ramtite Company, Div. of S. Obermayer Co., 1803 S. Rockwell St., Chicago, Ill.
Chas. Taylor Sons Co., Cincinnati, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

BRIQUETS (Alloy)
Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.
Electro Metallurgical Sales Corp., 30 E. 42nd. St., New York, N. Y.

BRIQUETS (Ferro Alloy)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

BRIQUETS (Silicon Carbide)
Carborundum Co., Niagara Falls, N. Y.

BRIQUETTING MACHINERY (Metal)
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

BRUSHES
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.

BUCKETS (Elevating, Clam Shell, Drag Line, Grab, Loader, Dumping)
Blaw-Knox Co., Farmers Bank Bldg.,
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Eichfeld, Wm. F., & Sons Co., 2550 No. 30th St., Milwaukee, Wis.
Pittsburgh, Pa.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Penn Iron Works, Reading, Pa.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

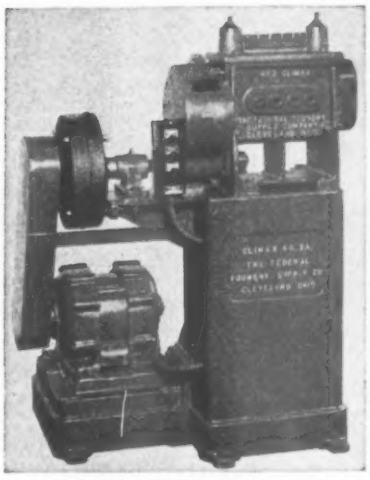
BUILDING and ENGINEERING SERVICE
American Bridge Co., Pittsburgh, Pa.

BURNERS (Acetylene, Oil, Gas, Powdered Coal, Stoker)
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Hauck Mfg. Co., 106 Tenth St., Brooklyn, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.
North American Mfg. Co. 2910 E. 75th St., Cleveland, O.
Surface Combustion Co., Toledo, O.

—When writing advertisers, please mention THE FOUNDRY—

SAVE WHILE YOU PRODUCE

with **FEDERAL PRODUCTS**



FEDERAL CLIMAX WIRE STRAIGHTENERS

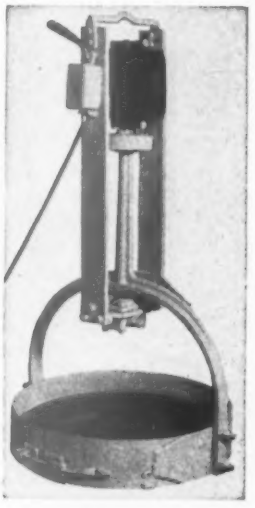
● Any foundry, large or small, can cut production costs by straightening and re-using core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely—by unskilled labor. A complete descriptive circular is yours for the asking.

FEDERAL CORE-JARRING MACHINES

● Eliminate hand ramming and get uniformly rammed cores with Federal Core Jarring Machines. Powered by air, these machines are sturdy and long wearing. Readily available *now* when you need them. The present lack of experienced labor will not handicap your shop if you have Federal Core Jarring Machines.

Made in four sizes, graded by size of table and capacity: No. 0, table 10″ x 10″, capacity 150 lbs.; No. 1, table 12″ x 12″, capacity 300 lbs.; No. 2, table 18″ x 18″, capacity 400 lbs. and No. 5, table 18″ x 20″, capacity 600 lbs.

Write for details and prices on these labor-savers today.



FEDERAL LOWE ELECTRIC SIFTER

● Faster sifting, better sand conditioning combine to cut costs when a Lowe is on the job. Malleable yoke creates faster sifting; more shovel clearance permits faster loading. Enclosed ball bearing motor is a miser on current. Instantly replaceable screen bottoms. Lowe-sifted sand is better sand.

FEDERAL WONDER CUTTER

● Users say it's worth its weight in gold. Small enough to be mounted on any bench or table, the Wonder Cutter will cut round or square rods and band iron. Priced at $39.50 f.o.b. Cleveland—every foundry should own one.

"The Twist Does The Trick"

FEDERAL TWISTED STEM CHAPLETS

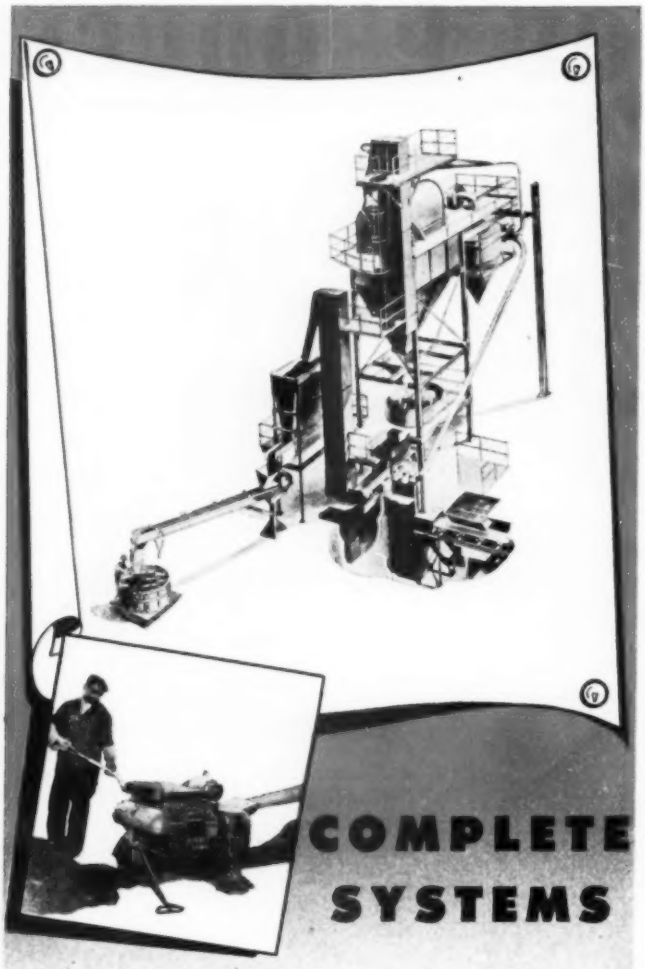
● The chaplet with everything. The *Twisted Stem* promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

THE FEDERAL FOUNDRY SUPPLY CO.

4600 EAST 71st STREET, CLEVELAND, OHIO

CHICAGO — CHATTANOOGA, TENN. — CROWN HILL, W. VA. — DETROIT — MILWAUKEE
MINNEAPOLIS — NEW YORK — RICHMOND, VA. — ST. LOUIS — UPTON, WYO.

Chamberlain Co., Los Angeles, Calif.—Pacific Graphite Wks., Oakland, Calif.—LaGrand Industrial Supply Co., Portland, Ore.—Shanahan's Ltd., Vancouver, B. C.



COMPLETE SYSTEMS

OR SINGLE UNITS

for Large or Small Foundries

ALUMINUM

BRASS

IRON

STEEL

MAGNESIUM

JEFFREY EXPERIENCED FOUNDRY ENGINEERS ARE AVAILABLE FOR ACCURATE ANALYSIS AND LAYOUT

Sand Handling and Preparation Systems

Mold Handling Systems

Casting Handling Systems

JEFFREY .... ESTABLISHED 1877

THE JEFFREY MANUFACTURING COMPANY

907-99 North Fourth St., Columbus 16, Ohio

SALES OFFICES: Baltimore, Birmingham, Buffalo, Chicago, Cleveland, Detroit, Denver, Harlan, Huntington, Milwaukee, New York, Pittsburgh, Scranton, St. Louis

BUSHINGS (Flask-Pin)
Hines Mfg. Co. 1324 Hird Ave., Cleveland, O.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

BUSHINGS (Hammer)
Steel Conversion & Supply Co., Library Road, Castle Shannon, Pittsburgh, Pa.

CALCIUM MOLYBDATE
Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.
Molybdenum Corporation of America, Pittsburgh, Pa.

CALCIUM BORIDE
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Molybdenum Corporation of America, Pittsburgh, Pa.

CASSETTES (X-Ray Film)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

CASTINGS
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.
City Pattern Foundry & Machine Co., 1165 Harper Ave., Detroit, Mich.

CASTING PLASTER
National Gypsum Co., Buffalo, N. Y.
United States Gypsum Co., 300 W. Adams St., Chicago, Ill.

CASTING SEALER & IMPREGNATING
Empire Varnish Co., 2636 E. 76th St., Cleveland, O.

CEMENT (Metallic)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Frederic B. Stevens, Inc., Detroit, Mich.
Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City, N. J.

CEMENT (Refractory)
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester, Mass.
Ramtite Company, Div. of S. Obermayer Co., 1803 S. Rockwell St., Chicago, Ill.
Chas. Taylor Sons Co., Cincinnati, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

CHAIN (Hoist, Conveyor, Drive, Sling, etc.)
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Link Belt Co., 300 W. Pershing Rd. Chicago, Ill.

CHAPLETS
Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland, O.
Combined Supply & Equipment Co. Inc., 215 Chandler St., Buffalo, N. Y.
Fanner Mfg. Co., Brookside Park, Cleveland, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Milwaukee Chaplet & Mfg. Co., 1023 So. 40th St., Milwaukee, Wis.
One Piece Chaplet Co., 4001 Ashland Philadelphia, Pa.
Frederic B. Stevens, Inc., Detroit, Mich.

CHARGING CARS
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.

CHEMICALS
American-British Chemical Inc., 180 Madison Ave., New York.
Hercules Powder Co., 999 Market St., Wilmington, Del.
Jobbins, Wm. F., Co., Aurora, Ill.
The Mathieson Alkali Works, Inc., 60 E. 42nd St., New York, N. Y.

CHEMISTS
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago, Ill.

CHILLS
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
Chicago Chaplet Co., 2047 N. Wood St., Chicago, Ill.
Fanner Mfg. Co., Brookside Park, Cleveland, O.
Milwaukee Chaplet & Mfg. Co., 1023 So. 40th St., Milwaukee, Wis.

CHILL COATINGS
Dayton Oil Co., Dayton, O.

CHILL NAILS
Capewell Mfg. Co., Hartford, Conn.
Standard Horse Nail Corp., New Brighton, Pa.

CHILL OILS
Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago, Ill.

CHISELS (Chipping)
Steel Conversion & Supply Co., Library Road, Castle Shannon, Pittsburgh, Pa.

CHIPPERS—See PNEUMATIC TOOLS

CHILL COILS
Fanner Mfg. Co., Brookside Park, Cleveland, O.
J. S. McCormick Co., 25th St. & A.V.R.R. Pittsburgh, Pa.

CHROMIUM (Briquets)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

CINDER MILLS
Dreisbach Engineering Corp., 45 Warburton Ave., Yonkers, N. Y.

CLAMPS (Flask)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

CLAY (Bonding)
American Colloid Co., 363 W. Superior St., Chicago, Ill.
Eastern Clay Products, Inc., Elfort, O.
The Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
The Lawrence Clay Co., Jackson, O.
F. E. Schundler & Co. Inc., 320 Railroad Ave., Joliet, Ill.

CLAY STORAGE BINS
Neff & Fry, Camden, O.

CLEANING COMPOUNDS (Window, etc.)
Hercules Powder Co., 999 Market St., Wilmington, Del.

CLEANING EQUIPMENT (Castings)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati, O.

CLUTCHES (Magnetic)
Stearns Magnetic Mfg. Co., 622 S. 28th St., Milwaukee, Wis.
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee, Wis.

COAL STORAGE BINS
Neff & Fry, Camden, O.

COKE (Foundry)
Hickman-Williams & Co., Cleveland, O
Pickands, Mather & Co., Cleveland, O.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago, Ill.

COLLECTORS (Dust)
American Air Filter Co. 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Buell Engineering Co., 14 Cedar St., New York City.
R. C. Mahon Co., 8650 Mt. Elliot Ave., Detroit, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O
Peters-Dalton Inc., 628 E. Forest Ave., Detroit, Mich.
Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

COMBUSTION EQUIPMENT
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.

CONCRETE STORAGE BINS
Neff & Fry Co., Camden, O.

CONTROL SYSTEMS (Dust)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Air Filter Co., 223 Central Ave., Louisville, Ky.
Buell Engineering Co., 14 Cedar St., New York City.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

CONVERTERS (Bessemer)
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVERTER BLOWERS
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.

CONVEYORS (Belt)
Beardsley & Piper Co., The
2541 N. Keeler Ave., Chicago, Ill.
C. O. Bartlett & Snow Co.,
6201 Harvard Ave., Cleveland, O.
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Mahr Mfg. Co., Minneapolis, Minn.

CONVEYORS (Belt) (Cont'd.)
The Manhattan Rubber Mfg.
Passaic, N. J.
Robins Conveyors Inc.,
Passaic, N. J.
Standard Conveyor Co.,
North St. Paul, Minn.

CONVEYORS (Chain)
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co.,
North St. Paul, Minn.

CONVEYORS (Gravity)
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co.,
North St. Paul, Minn.

CONVEYORS (Live Roller)
Standard Conveyor Co.,
North St. Paul, Minn.

CONVEYORS (Magnetic)
Stearns Magnetic Mfg. Co.,
662 S. 28th St., Milwaukee, Wis.

CONVEYORS (Monorail)
American Monorail Co.,
13104 Athens Ave., Cleveland, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co.,
1153 East 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Penn Iron Works, Reading, Pa.

CONVEYORS (Pneumatic)
Fuller Company, Catasaqua, Pa.

CONVEYORS (Rubber)
Osborn Mfg. Co.,
5401 Hamilton Ave., Cleveland, O.
Standard Conveyor Co.,
North St. Paul, Minn.

CONVEYORS (Vibrating)
Ajax Flexible Coupling Co.,
Westfield, N. Y.
Syntron Company, Homer City, Pa.

COPPER
American Smelting & Refining Co.,
120 Broadway, New York

COPPER SHOT
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Smelting & Refining Co.,
120 Broadway, New York
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave.,
Buffalo, N. Y.
Silverstein & Pinsof Inc., 1720 N. Elston, Chicago, Ill.

CORE BINDERS
American Gum Products Co., 500 Fifth Ave., New York, N. Y.
Certified Core Oil & Mfg. Co.,
3308 So. Cicero Ave., Chicago, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago, Ill.
Corn Products Sales Co.,
17 Battery Pl., New York City.
Dayton Oil Co.,
Dayton, O.
Delta Oil Products Co.,
Milwaukee, Wis.
Federal Foundry Supply Co.,
4600 E. 71st St., Cleveland, O.
Foundry Rubber Compounds Corp.,
1050 Thirtieth St., N. W.,
Washington, D. C.
Hercules Powder Co., 999 Market St., Wilmington, Del.
International Paper Co.,
220 E. 42nd St., New York City.
J. S. McCormick Co., 25th St., & A.V.R.R., Pittsburgh, Pa.
Penola Inc., Pittsburgh, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Robeson Process Co., 500 Fifth Ave., New York.
Swan-Finch Oil Corp., R.C.A. Bldg., West, New York.
Werner G. Smith Co., (Div. of Archer-Daniels-Midland Co.), 2191 W. 110th St., Cleveland, O.
Frederic B. Stevens, Inc.,
Detroit, Mich.
United Oil Mfg. Co.,
1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago, Ill.

CORE BLOWING MACHINES
Champion Foundry & Machine Co., 1314 West 21st St., Chicago, Ill.

CORE BLOWING MACHINES (Cont'd.)
Wm. Demmler & Bros.,
Kewanee, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co.,
5401 Hamilton Ave., Cleveland, O.

CORE BREAKERS
Cleveland Pneumatic Tool Co.,
3781 East 77th St., Cleveland, O.

CORE COMPOUND
Ace Foundry Materials Co.,
14862 Furrer St., Detroit, Mich.
Certified Core Oil & Mfg. Co.,
3308 So. Cicero Ave., Chicago, Ill.
Cities Service Oil Co., 3200 S. Western Ave,, Chicago, Ill.
Dayton Oil Co.,
Dayton, Ohio.
Delta Oil Products Co.,
Milwaukee, Wis.
The Federal Foundry Supply Co.,
4600 E. 71st St., Cleveland, O.
Foundry Rubber Compounds Corp.,
1050 Thirtieth St., N. W.,
Washington, D. C.
International Paper Co.,
220 E. 42nd St., New York City.
The Werner G. Smith Co., (Div. of Archer-Daniels-Midland Co.), 2191 W. 110th St., Cleveland, O.
J. S. McCormick Co., 25th St. & A.V.R.R., Pittsburgh, Pa.
Penola Inc., Pittsburgh, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Smith Facing & Supply Co.,
1857 Carter Rd., Cleveland, O.
Frederic B. Stevens, Inc.,
Detroit, Mich.
Swan-Finch Oil Corp., R.C.A. Bldg., West, New York.
Velsicol Corp., 120 E. Pearson St., Chicago, Ill.
E. J. Woodison Co., 7515 St. Aubin Ave., Detroit, Mich.

CORE CUTTING AND CONING MACHINES
Wadsworth Core Machine & Equip. Co., Akron, O.

CORE DRAWER
Freeman Supply Co.,
Toledo, O.

CORE GRINDERS (Power Operated)
Milwaukee Foundry Equipment Co.,
3238 W. Pierce St.,
Milwaukee, Wis.

CORE KNOCKOUT MACHINES
Beardsley & Piper Co., The,
2541 N. Keeler Ave., Chicago, Ill.
Hydro-Blast Corp. 2550 N. Western Ave., Chicago, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co.,
Durand, Mich.

CORE MAKING MACHINES
Champion Foundry & Machine Co.,
1314 W. 21st St., Chicago, Ill.
Davenport Machine & Foundry Co.,
Davenport, Iowa.
Wm. Demmler & Bros.,
Kewanee, Ill.
Herman Pneumatic Machine Co.,
Union Bank Bldg., Pittsburgh, Pa.
International Molding Machine Co.,
2608 W. 16th St., Chicago, Ill.
Milwaukee Foundry Equipment Co.,
3228 W. Pierce St.,
Milwaukee, Wis.
Wadsworth Core Machine & Equip. Co., Akron, O.

CORE OIL
Buckeye Products Co.,
7022 Vine St., Cincinnati, O.
Certified Core Oil & Mfg. Co.,
3308 So. Cicero Ave., Chicago, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago, Ill.
Dayton Oil Co., Dayton, O.
Delta Oil Products Co.,
Milwaukee, Wis.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Werner G. Smith Co., (Div. of Archer-Daniels-Midland Co.), 2191 W. 110th St., Cleveland, O.
Frederic B. Stevens, Inc.,
Detroit, Mich.
Penola Inc., Pittsburgh, Pa.
Swan-Finch Oil Corp., R.C.A. Bldg., West, New York.
Tiona Petroleum Co.,
Widener Bldg., Philadelphia, Pa.
United Oil Mfg. Co.,
1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago, Ill.
E. J. Woodison Co., 7515 St. Aubin Ave., Detroit, Mich.

CORE OVENS
G. S. Blodgett Co. Inc.,
Burlington, Vt.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, O.

—When writing advertisers, please mention THE FOUNDRY—

YES, WATERLOX SEALS ALL TYPES OF POROUS CASTINGS

CENTRIFUGAL PUMPS
MARINE and AIRPLANE PUMPS
CYLINDER BLOCKS
CYLINDER HEADS
MANIFOLDS and HEATERS
and all other parts cast for use in
MARINE AIRPLANE and OTHER ENGINES

All these parts, and many others too, have been impregnated with Waterlox Transparent and the results have been highly effective. Porous, non-ferrous can be sealed and made pressure tight by this method.

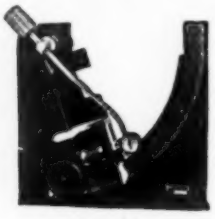
Use our Consultation Service to solve your problems and eliminate the expensive rejections of "leaky" and "weeping" castings. Save labor, time and material costs. Just write us today—and ask about our complete line of maintenance paints, too.

WATERLOX
DIVISION OF
THE EMPIRE VARNISH COMPANY
2636 East 76th St. Cleveland, Ohio

SAND CONTROL

Moisture Teller

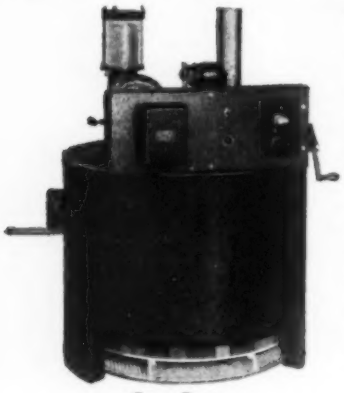
Permeability Meter



Strength Machine

Measure the moisture, permeability, green strength, deformation and dry strength of molding sands

CORE TESTING



Core Oven

The Test Core Baking Oven is electrically heated for baking test cores entirely by convected heat. It is ideal for baking test specimens to determine the strength of core oils, binders, or the quality of core sands. Constructed in accordance with A.F.A. specifications.

MODERN ANALYSIS

Carbon Determinator

Carbon Determinator provides accurate determinations of carbon in ferrous and non-ferrous materials for either preliminary or final analysis within two minutes exclusive of weighing time.

Sulphur Determinator provides accurate determinations within three minutes.

SAND LABORATORY

Our complete sand laboratory and technicians solicit your test work on molding sands, core sands, silica sands, core oils, core binders, and bonding clays. Recommendations made for eliminating casting defects.

HARRY W. DIETERT CO.

9330 Roselawn Ave.

DETROIT, MICH.

CORE OVENS (Cont'd.)
Despatch Oven Co., Minneapolis, Minn.
Foundry Equipment Co., Cleveland, O.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
Haynes Foundry Equipt Co., 1734 Lake St., Kalamazoo, Mich.
Lanly Company, 750 Prospect Ave., Cleveland, O.
Maehler, Paul, Co., 2200 W. Lake St., Chicago, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., Dept. F8, Minneapolis, Minn.
R. C. Mahon Co., 8650 Mt. Elliott Ave., Detroit, Mich.
Monarch Engineering & Mfg. Co., Baltimore, Md.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York
Vulcan Corporation, 18th & Cherry Sts., Philadelphia, Pa.
Young Brothers Co., 6508 Mack Ave., Detroit, Mich.

CORE PASTE
Corn Products Sales Co. 17 Battery Pl., New York City.
Dayton Oil Co., Dayton, O.
Delta Oil Products Co., Milwaukee, Wis.
Eastern Clay Products, Inc., Elfort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
J. S. McCormick Co., 25th St. & A.V.R.R., Pittsburgh, Pa.

CORE PLATES (Steel Asbestos)
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Diamond Clamp & Flask Co., Richmond, Ind.
Johns-Manville, 22 East 40th St., New York City.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.
Wadsworth Core Machine & Equip. Co., Akron, O.

CORE RODS
Bethlehem Steel Co., Bethlehem, Pa.

CORE ROD STRAIGHTENING and CUTTING MACHINERY
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.

CORE SAND
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Ottawa Silica Co., Ottawa, Ill.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

CORE SAND MIXERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

CORE SPRAYERS
Freeman Supply Co., 1152 Broadway Toledo, Ohio.

CORE TRUCKS
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.
Eichfeld, Wm. F., & Sons Co., 2550 No. 30th St., Milwaukee, Wis.

CORE VENTS
Champion Foundry and Machine Co., 1314 W. 21st St., Chicago, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
United Compound Co., Inc., 328 South Park Ave., Buffalo, N. Y.

CORE WASH
Carborundum Co., Niagara Falls, N. Y.
Cities Service Oil Co., 3200 S. Western Ave., Chicago, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City.
Dayton Oil Co., Dayton, O.
Delta Oil Products Co., Milwaukee, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Foundry Services Inc., 280 Madison Ave., New York, N. Y.

CORE WASH (Cont'd.)
J. S. McCormick Co., 25th St. & A.V.R.R., Pittsburgh, Pa.
Penola Inc., Pittsburgh, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Pollard Oil Products Co., 1627 So. 44th St. Milwaukee, Wis.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland, O.
Frederic B. Stevens, Inc., Detroit, Mich.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
United States Graphite Co. Saginaw, Mich.

CORE WIRE
Progressive Core Wire Co., 1025 Bronson Court, S. E., Cleveland, O.

CORE WIRE CUTTERS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

CORE WIRE STRAIGHTENERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

COUPLINGS (Flexible)
Ajax Flexible Coupling Co., Westfield, N. Y.

CRANES (Bucket)
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANE CONTROL (Electric)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CRANE LUBRICATING SYSTEMS
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Electric Traveling)
American MonoRail Co., 13104 Athens Ave., Cleveland, O.
Cleveland Tramrail Div., of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Ill.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Gantry)
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Hand Travelling)
American MonoRail Co., 13104 Athens Ave., Cleveland, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp. 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)
American MonoRail Co., 13104 Athens Ave., Cleveland, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Eichfeld, Wm. F., & Sons Co., 2550 No. 30th St., Milwaukee, Wis.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail)
American Engineering Co., 2418 Aramingo Street, Philadelphia, Pa.
American MonoRail Co., 13104 Athens Ave., Cleveland, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Ill.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

CRANES (Portable, Electric)
Automatic Transportation Co., 121 West 87th St., Chicago, Ill.

—When writing advertisers, please mention THE FOUNDRY—

MANHATTAN ABRASIVE WHEELS

Custom-Engineered for Service

Rubber and resinoid bonded—for sustained high-speed operation—MANHATTAN Abrasive Wheels wear evenly, grind accurately.

Designed and engineered with proper specifications for your job. Wheels also for snagging, cutting-off; and resilient wheels for polishing.

For special grinding problems, consult

ABRASIVE WHEEL DEPARTMENT

THE MANHATTAN RUBBER MFG. DIVISION

OF RAYBESTOS-MANHATTAN, INC.

Executive Offices and Factories—77 Townsend St., Passaic, N.J.

THE

WADSWORTH CORE MACHINE AND EQUIPMENT COMPANY

◆

Manufacturers of

AMERICAN "RAPID"

"HAMMER" and "WADSWORTH"

Stock Core Making Machines

◆

Cutting Off and Coning Machines

◆

Steel Reinforced

Core and Bottom Plates

◆

AKRON, OHIO

SAVE

SOUND but BLEMISHED

CASTINGS

WITH

SMOOTH-ON No. 4

WHEN inspection shows flaws that actually impair strength, of course you scrap the casting. But when inspection shows merely unimportant surface blemishes, pits, sand holes, blow holes, irregular contours, that are unsightly but do not affect inner soundness, correct them with Smooth-On No. 4 Foundry Cement.

A few cents' worth of Smooth-On, a few minutes to apply, a few hours to harden, and you have a perfectly matched surface that looks like iron, expands or contracts like iron. For it actually *is* iron, capable of being filed and machined. Comes in three types to duplicate color, texture and lustre of your castings.

SMOOTH-ON NO. 4AA—For matching light gray castings and machined surfaces. High metallic lustre. In 1-lb., 10-lb. and 50-lb. containers.

SMOOTH-ON NO. 4A—Matches medium gray castings. Fine grained. Good metallic lustre. In 1-lb., 5-lb., 25-lb. and 100-lb. containers.

SMOOTH-ON NO. 4B—Matches dark gray castings. Coarser grain. Darker color. In 1-lb., 5-lb., 25-lb. and 100-lb. containers.

For nearly half a century leading foundries have been using Smooth-On to correct harmless but unsightly casting imperfections, to make appearance live up to inherent quality. Unless you have already used Smooth-On, you cannot realize what a perfect job it does. Order Smooth-On from your supply house and give it a critical test.

FREE

Hardened and Working Samples

The 40-page Smooth-On Handbook

SMOOTH-ON MFG. CO., Dept. 17,
570 Communipaw Ave., Jersey City 4, N. J.

☐ Send Smooth-On Handbook
☐ Send hardened Smooth-On samples
☐ Send working samples of Smooth-on ☐ No. 4AA
☐ No. 4A ☐ No. 4B

Name .....

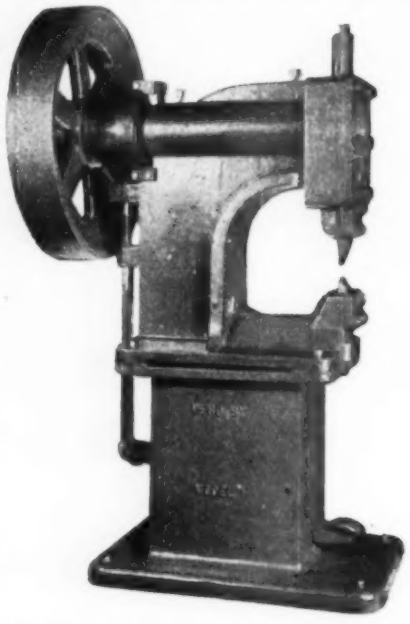
Address .....

11-43 .....

Do it with **SMOOTH-ON**

SPRUE CUTTERS ★ **NEW!**

for IMMEDIATE DELIVERY



2 SIZES

MODEL "H"
capacity 3 4"
sq common brass
9" depth of throat
Height O A 5'3"
Weight 1025 lbs.

●

MODEL "I"
capacity 1-1/4"
sq common brass
13" depth of throat
Height O A 6 ft.
Weight 2400 lbs.

●

Write, Wire or Phone
PROspect 8770

Scully Machinery & Equipment Corp.
(Formerly—Fdy. Division Scully-Jones & Co.)
NEW *Warehouse and Office* → 2031 West 74th Street Chicago, Illinois

BESSEMER FERRO-SILICONS

GLOBE IRON COMPANY

JACKSON
OHIO
JACKSON COUNTY
SILVERIES

SPECIAL HIGH SILICON GRADES

FOUNDED 1872

CRUCIBLES
American Crucible Co., Shelton, Conn.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Joseph Dixon Crucible Co., Jersey City, N. J.
Lava Crucible Co., Pittsburgh, Pa.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

CRUCIBLE FURNACES
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Monarch Engineering & Mfg. Co., Baltimore, Md.

CRUCIBLE LIFTERS
Modern Equipment Co., Dept. 199, Port Washington Wis.

CRUCIBLE POURING DEVICES
Modern Equipment Co., Dept. 199, Port Washington, Wis.

CRUSHERS & PULVERIZERS (Coal)
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.

CUPOLAS
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA AIR CONDITIONING
Surface Combustion Corp., Toledo, O.

CUPOLA BLOWERS
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES
American MonoRail Co., 13104 Athens Ave., Cleveland, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT
Edwin S. Carman, Lee Rd. at Mayfield, Cleveland, O.
Foxboro Co., Foxboro, Mass.

CUPOLA DRY BLAST
Surface Combustion Corp. Toledo, O.

CUPOLA DUST ARRESTORS
Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CUPOLA LIGHTERS
Cleveland Quarries Co., Cleveland, Ohio.
Hauck Mfg. Co., 106 Tenth St., Brooklyn, N. Y.

CUPOLA LININGS
Carborundum Co., Niagara Falls, N. Y.
Haws Refractories Co., Johnstown, Pa.
Ironton Fire Brick Co., Ironton, O.
Ramtite Company, Div. of S. Obermayer Co. 1803 S. Rockwell St., Chicago, Ill.
Chas. Taylor Sons Co., Cincinnati, O.
United States Graphite Co., Saginaw, Mich.

CUPOLA SPARK ARRESTORS
Whiting Corp., 15607 Lathrop Ave., Chicago, Ill.

CUTOFF MACHINES (Abrasive)
Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.,
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.

CUTTING OILS
Penola Inc., Pittsburgh, Pa.

DARK ROOM ACCESSORIES (X-Ray)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

DARK ROOM PROCESSING (Chemical Tanks, etc.)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

DEGASIFIERS
American-British Chemical Inc., 180 Madison Ave., New York.
Foundry Services Inc., 280 Madison Ave., New York, N. Y.

DEOXIDIZERS
American Smelting & Refining Co., 120 Broadway, New York
Cleveland Flux Co., 1026 Main St., Cleveland, O.

DESULPHURIZERS
Cleveland Flux Co., 1026 Main St., Cleveland, O.
Hercules Powder Co., 999 Market St., Wilmington, Del.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York, N. Y.
Modern Equipment Co., Dept. 199 Port Washington, Wis.
Pittsburgh Plate Glass Co., Columbia Chemical Div., Grant Bldg., Pittsburgh, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DIES
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.
City Pattern Foundry & Machine Co. 1161 Harper Ave., Detroit, Mich.

DRILLS (Pneumatic)
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.
Gardner- Denver Co., Gardner Drive, Quincy, Ill.
Schramm Inc., West Chester, Pa.

DRILL PRESSES
Delta Mfg. Co., Industrial Div., 620 E. Vienna Ave., Milwaukee, Wis.

DRIVES (Reciprocating)
Ajax Flexible Coupling Co., Westfield, N. Y.

DRUMS (Magnetic)
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee, Wis.

DUMP HOPPERS
Roura Iron Works, 1405 Woodland Ave., Detroit, Mich.

DUST ARRESTING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Buell Engineering Co., 14 Cedar St., New York, N. Y.
R. C. Mahon Co., 8650 Mt. Elliott Ave., Detroit, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit, Mich.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee Wis.
Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

DUST RECOVERY SYSTEMS
Buell Engineering Co., 14 Cedar St. New York City.
Parsons Engineering Corp., Cleveland, O.

ELECTRIC FURNACES (see Furnaces Electric)

ELEVATORS
Standard Conveyor Co., North St. Paul, Minn.

ELEVATORS (Bucket)
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Manhattan Rubber Mfg. Div. of Raybestos Manhattan Inc., Passaic, N. J.

ELEVATORS (Material Handling)
Link Belt Co., 300 W. Pershing Rd. Chicago, Ill.

ELEVATORS (Pneumatic, Material Handling)
Fuller Company, Catasaqua, Pa.

ENGINEERING SERVICE (Foundry)
Edwin S. Carman, Lee Rd. at Mayfield, Cleveland, O.

ENGINEERING SERVICE (Cont'd.)
Giele, Walter, Co., First National Bank Bldg., Lebanon, Pa.
Chas. C. Kawin Co., 431 S. Dearborn St., Chicago, Ill.
A. A. Wickland Co., 205 W. Wacker Dr., Chicago, Ill.

EXHAUST SYSTEMS
American Air Filter Co., Inc., 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co., 505 S. Byrkit St. Mishawaka, Ind.
DeBothezat Ventilating Equip. Div., American Machine & Metals Co., East Moline, Ill.

—When writing advertisers, please mention THE FOUNDRY—

Hammond's GRINDER FEATURES EVERY FOUNDRYMAN WANTS

- LARGER SPINDLES
- MULTI-V BELT DRIVE
- LARGER BEARINGS
- STEEL PLATE GUARDS
- USES ANY STANDARD MOTOR
- MORE WORK SPACE AROUND WHEELS

HAMMOND MULTI-HI SPEED GRINDER
Available in two sizes—WR-1 and WR-2

Hammond Machinery Builders INC. KALAMAZOO 54 MICHIGAN

WRITE FOR COMPLETE SPECIFICATIONS

☐ WR-1 1, 2 and 3 Speeds 5, 7 and 10 H P

☐ WR-2 2, 3 and 4 Speeds 10, 15 and 20 H P

1605 Douglas Avenue • Eastern Branch—71 W. 23rd St., New York 10, N. Y.

NEFF & FRY BINS

- Any Capacity
- Fast Erection
- Moderate Cost

Permanent Improvement for any Foundry.
Get 1943 Catalog.

Outside sand storage is too wasteful, too risky—plain terrible. With Neff & Fry bins you can order sand in quantities and save on price—safeguard against car shortage and exhaustion of supply. You can keep sand in condition at all times and reduce on lost castings. You can save on labor, floor space. You can pay for bins in no time out of benefits received.

Modernize—install Neff & Fry bins (stave or monolithic). Broad guarantee given. Get 1943 Catalog.

THE NEFF & FRY CO.
CAMDEN, OHIO

IT'S SLAG-PROOF!

a special alloy tube protects this tip!

A thermocouple built to take temperature within the melt and to stand immersion again and again . . . such is the Marshall Enclosed-Tip Thermocouple! It's the new hot-junction tip that does it. This renewable tip is completely enclosed by a tube of special heat-resistant alloy, so no slag nor molten metal can get into it. The Marshall Thermocouple therefore stands constant use and is always ready. It eliminates the use of troublesome open-end, twisted-wire thermocouples.

The Marshall Thermocouple measures temperature of molten brass, bronze, copper, aluminum, magnesium. Gives quick, accurate readings. Furnace and Ladle types for use with stationary or portable pyrometer indicators.

MARSHALL
Enclosed-Tip
THERMOCOUPLE

Marshall Enclosed-Tip Thermocouples are the Industry's standard for keeping pouring temperatures just right.

Send for this Folder, or get it from the Pyrometer manufacturer you patronize.

L. H. MARSHALL CO.
272 W. Lane Ave.
Columbus, Ohio

BELLEVUE

Hydraulic Nose Tilt Melting Furnaces for Aluminum, Magnesium, and Other Non-Ferrous Metals

Crucible or Pot Types — Gas or Oil-Fired

The 1000 lb. Aluminum Crucible Type Melting Furnace illustrated is one of many sizes ranging up to 3000 lb. capacity. All have the exclusive "flat-top" feature.

Less floor space and height is required.

BELLEVUE INDUSTRIAL FURNACE CO.
2975 Bellevue Ave. Detroit, Mich.

CHAPLETS

"LEEK-PRUF"
DOUBLE HEAD

Buffalo "Leek-Pruf" Chaplets are so readily fused that leakage is definitely eliminated. If you have not had an opportunity to try Buffalo chaplets send for samples and prices. A trial will convince.

COMBINED SUPPLY & EQUIPMENT CO.
215 CHANDLER ST.
BUFFALO, N. Y.

CARMAN ENGINEERS

SATISFIED WITH YOUR PRODUCTION ? ?

Do your methods produce the output you desire with present plant and equipment or do hidden waste and inefficiency cut deep into monthly production? Rearrangement of equipment and improved methods will eliminate waste, reduce costs, and secure a peak production.

EDWIN S. CARMAN, INC.
Foundry Engineers and Consultants
LEE RD. AND MAYFIELD—CLEVELAND, OHIO

EXHAUST SYSTEMS (Cont'd.)
Pangborn Corporation, Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
Propellair Inc., Springfield, O.
Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

EYE SHIELDS and GOGGLES—See Goggles

FABRICATORS (Metal)
Roura Iron Works, 1405 Woodland Ave., Detroit, Mich.

FACINGS
Delta Oil Products Co., Milwaukee, Wis.
Frederic B. Stevens, Inc., Detroit, Mich.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia, Pa.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United States Graphite Co., Saginaw, Mich.
E. J. Woodison Co., 7515 St. Aubin Ave., Detroit, Mich.

FANS (Ventilating, Exhaust, Cooling, etc.)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
DeBothezat Ventilating Equip. Div., American Machine & Metals Co., East Moline, Ill.
General Blower Co., 406 N. Peoria St., Chicago, Ill.
Mahr Mfg. Co. Div. of Diamond Iron Works Inc., Minneapolis, Minn.
Pangborn Corp., Hagerstown, Md.
Propellair Inc., Springfield, O.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

FEEDERS (Rotary)
Fuller Company, Catasaqua, Pa.

FEEDERS (Sand)
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.

FERROCHROME
Hickman-Williams & Co., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Ohio Ferro-Alloys Corp., Canton, O.

FERROMANGANESE
Bethlehem Steel Co., Bethlehem, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Ohio Ferro-Alloys Corp., Canton, O.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.
Molybdenum Corporation of America, Pittsburgh, Pa.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Ohio Ferro-Alloys Corp., Canton, O.

FERROTITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York City

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

FILMS (X-Ray)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

FILTERS (Air)
American Air Filter Co., 266 Central Ave., Louisville, Ky.
Staynew Filter Co., 36 Centre Pk., Rochester, N. Y.

FILTERS (All Types)
Staynew Filter Co., 36 Centre Pk., Rochester, N. Y.

FIRE BRICK
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Frederic B. Stevens, Inc., Detroit, Mich.
Haws Refractories Co., Johnstown, Pa.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester, Mass.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia, Pa.
Chas. Taylor Sons Co., Cincinnati, O.

FIRE CLAY
Eastern Clay Products, Inc., Elfort, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Lawrence Clay Co., 112 Columbia St., Jackson, O.
Chas. Taylor Sons Co., Cincinnati, O.

FIRE SAND
Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., 1125 Builders Exchange Bldg., Cleveland, Ohio.

FIRESTONE
Cleveland Quarries Co., 1125 Builders Exchange Bldg., Cleveland, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.

FIRST AID (For Burns)
Lee-Wood, Inc., South Norwalk, Conn.

FLASKS (Aluminum)
Adams Co., 700 Foster St., Dubuque, Iowa.
American Foundry Equipment Co., Mishawaka, Ind.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.

FLASKS (Dowmetal)
American Foundry Equipment Co., Mishawaka, Ind.
Frement Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.

FLASK FILLERS
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.

FLASKS (Slip)
Adams Co., 700 Foster St., Dubuque, Ia.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Fremont Flask Co., Fremont, O.
Freeman Supply Co., Toledo, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.

FLASKS (Snap)
Adams Co., 700 Foster St., Dubuque, Iowa.
American Foundry Equipment Co. 505 S. Byrkit St., Mishawaka, Ind.
Arcade Manufacturing Co., Freeport, Ill.
Diamond Clamp & Flask Co., Richmond, Ind.
Frederic B. Stevens, Inc. Detroit, Mich.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.

FLASKS (Steel)
Eichfeld, Wm. F., & Sons Co., 2550 No. 30th St., Milwaukee, Wis.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

FLASK FITTINGS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

FLASK LUMBER
Dougherty Lumber Co., 4300 E. 68th St., Cleveland, O.
Thomas & Proetz Lumber Co., 3400 N. Hall St., St. Louis, Mo.

FLASKS (Wood)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.

FLEXIBLE SHAFT MACHINERY
Mall Tool Co., 7720 South Chicago Ave., Chicago, Ill.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago, Ill.

FLOORING (Non-Slip)
Norton Co., Worcester, Mass.

FLUXES
American-British Chemical Inc., 180 Madison Ave., New York.
Cleveland Flux Co., 1026 Main St., Cleveland, O.
Foundry Services Inc., 280 Madison Ave., New York, N. Y.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York, N. Y.
National Gypsum Co., Buffalo, N. Y.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo, N. Y.
Pittsburgh Plate Glass Co., Columbia Chemical Div., Grant Bldg., Pittsburgh, Pa.

FLUXES (Welding)
Eutectic Welding Alloys Inc., 40 Worth St., New York City.

A Tested Abrasive
PROVES ITS ECONOMY . . . .

Globe's "H. C." Chilled Shot and Cornered Steel Grit have been through the exacting performance tests of foundries for over 36 years. They have proven their economy. These steel abrasives are helping foundry cleaning rooms establish a high-speed, precision cleaning routine that assures the delivery of vital castings to war equipment on schedule. To keep your production uninterrupted, count on "H. C." Chilled Shot and Cornered Steel Grit.

H. C. CHILLED GLOBE SHOT

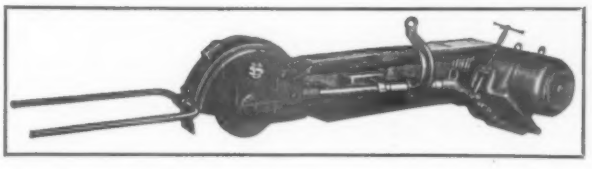
GLOBE STEEL ABRASIVE CO.

MANSFIELD, OHIO

It Goes Swingin' Along . . .

easy to handle . . . easy to use

UNITED STATES SWING FRAME GRINDER



perfect visibility . . . perfect balance . . . single suspension at center . . . angular adjustment . . . easy wheel change.

NOTE THE FEATURES:

GUARDS . . . fabricated boiler steel.

BALANCE . . . laterally and rotatively.

BALL BEARING THROUGHOUT.

VISIBILITY . . . no outboard bearings to obstruct.

V-BELT DRIVE . . . for light driving. Chips and dirt removed in grinding slide off.

SUSPENSION . . . single suspension at center. Double suspension at wheel head and motor end.

Write for delivery dates.

THE UNITED STATES ELECTRICAL TOOL CO.

CINCINNATI, OHIO, U.S.A.

A mite 'grey' around the temples . . . but spry as the day she was delivered!

● We, affectionately, call her Bessy . . . and she'll be 22 come "green up" time in the spring. Which ain't old for trees or mortgages or elephants. But which for bangtails, acetylene generators or mountain gals ain't young either. *But her capacity and willingness for an honest day's work contine unabated.* She's as spry as the day she came off the production line at West Alexandria . . . and the man who owns her wouldn't swap for our latest model. There's a satisfaction in building this kind of a product and a joy in having the kind of friendships it brings.

THE SIGHT FEED GENERATOR COMPANY

Sales: Richmond, Indiana • Factory: W. Alexandria, Ohio

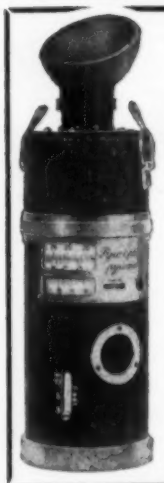
Sound CORE SUPPORT

Stem, Double Head, Patented Coil Head and Square Head types

Get good castings the FIRST time—avoid costly make-overs—save man-hours and delays.

DEPEND ON CLEVELAND CHAPLETS, backed by over 53 years' of dependability.

CLEVELAND CHAPLET & MFG. CO.
West 67th St. and N.Y.C. Ry., Cleveland, Ohio



PYRO THE SIMPLIFIED OPTICAL PYROMETER

HERE'S A HOT ONE!

A 3 lb., self-contained, DIRECT-READING simplified optical pyrometer that gives the TRUE SPOUT AND POURING TEMPERATURES OF MOLTEN IRON AND STEEL MEASURED IN THE OPEN! That's what the PYRO does! No upkeep, no accessories—and it quickly pays for itself. Don't swear AT other pyrometers; get a PYRO and swear BY it. For NON-FERROUS foundry, use PYRO IMMERSION PYROMETER. Write for catalogs describing ranges and types.

THE PYROMETER INSTRUMENT CO.
Plant & Lab.:
106 Lafayette St., New York 13, N. Y.

THE
JACKSON IRON & STEEL
COMPANY
Manufacturers of
"JISCO"
SILVERY
PIG IRON SPECIALTIES
JACKSON OHIO

FOUNDRY NAILS
Capewell Mfg. Co., Hartford, Conn.

FOUNDRY SUPPLY HOUSES
Buckeye Products Co., 7022 Vine St., Cincinnati, O.
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo, N. Y.
Eastern Clay Products, Inc., Elfort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Frederic B. Stevens, Inc., Detroit, Mich.
E. J. Woodison Co., 7515 St. Aubin Ave., Detroit, Mich.

FURNACES, (Aluminum & Magnesium Billets)
Despatch Oven Co., Minneapolis, Minn.

FURNACES, (Aluminum & Magnesium Forgings)
Despatch Oven Co., Minneapolis, Minn.

FURNACES, (Aluminum Rivet Heating)
Despatch Oven Co., Minneapolis, Minn.

FURNACE LININGS
Campbell-Hausfeld Co., Harrison, O.
Carborundum Co., Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Ironton Fire Brick Co., Ironton, O.
Ramtite Company, Div. of S. Obermayer Co., 1803 S. Rockwell St., Chicago, Ill.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago, Ill.
United States Graphite Co., Saginaw, Mich.

FURNACES (Aluminum & Magnesium Billets)
Dempsey Industrial Furnace Corp., Springfield, Mass.

FURNACES (Aluminum & Magnesium Forging)
Dempsey Industrial Furnace Corp., Springfield, Mass.

FURNACES (Annealing)
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit, Mich.
Cari-Mayer Corp., 3030 Euclid Ave., Cleveland, O.
Dempsey Industrial Furnace Corp., Springfield, Mass.
Despatch Oven Co., Minneapolis, Minn.
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
Mahr Manufacturing Co. Div., Diamond Iron Works Inc., Dept. F-10, Minneapolis, Minn.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Surface Combustion Co., Toledo, O.
Vulcan Corporation, 18th & Cherry Sts., Philadelphia, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES (Crucible Melting)
Ajax Metal Co., Philadelphia, Pa.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Mahr Mfg. Co. Div. of Diamond Iron Wks. Inc., Dept. F-10, Minneapolis, Minn.
Monarch Engineering & Mfg. Co., Baltimore, Md.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago, Ill.

FURNACES (Electric Melting)
Ajax Metal Co., Philadelphia, Pa.
American Bridge Co., Pittsburgh, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Electric Furnace Co., Salem, O.
Hydro-Arc Furnace Corp., 561 Hillgrove Ave., La Grange, Ill.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACES (Gas or Oil Fired)
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit, Mich.
Campbell-Hausfeld Co., Harrison, O.
Dempsey Industrial Furnace Corp., Springfield, Mass.
Electric Furnace Co., Salem, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.

FURNACES (Gas or Oil Fired) (Cont'd.)
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo, Mich.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago, Ill.
Surface Combustion Co., Toledo, O.
Vulcan Corporation, 18th & Cherry Sts., Philadelphia, Pa.

FURNACES (Gray Iron Melting)
American Bridge Co., Pittsburgh, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Hydro-Arc Furnace Corp., 561 Hillgrove Ave., La Grange, Ill.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Heat Treating)
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit, Mich.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, O.
Dempsey Industrial Furnace Corp., Springfield, Mass.
Despatch Oven Co., Minneapolis, Minn.
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
Maehler, Paul, Co., 2200 W. Lake St., Chicago, Ill.
Mahr Manufacturing Co. Div., Diamond Iron Works Inc., Dept. F-10, Minneapolis, Minn.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Surface Combustion Co., Toledo, O.
Vulcan Corporation, 18th & Cherry Sts., Philadelphia, Pa.

FURNACES, Heat Treating (Electric)
Despatch Oven Co., Minneapolis, Minn.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES, Heat Treating (Oil or Gas)
Despatch Oven Co., Minneapolis, Minn.

FURNACES (Malleable)
Mahr Manufacturing Co. Div., Diamond Iron Works Inc., Dept. F-10, Minneapolis, Minn.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.

FURNACES (Malleable Annealing)
Dempsey Industrial Furnace Corp., Springfield, Mass.
Electric Furnace Co., Salem, O.
General Electric Co., Schenectady, N. Y.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
Surface Combustion Co., Toledo, O.
Young Brothers Co., 6508 Mack Ave., Detroit, Mich.

FURNACES (Malleable Melting)
American Bridge Co., Pittsburgh, Pa.
Dempsey Industrial Furnace Corp., Springfield, Mass.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Nonferrous melting)
Ajax Metal Co., Philadelphia, Pa.
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit, Mich.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo, Mich.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Monarch Engineering & Mfg. Co., Baltimore, Md.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago, Ill.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACES (Powdered Coal)
Surface Combustion Co., Toledo, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

NEW
STEEL CONVERTERS
FOR
IMMEDIATE SALE

2 Three-ton capacity Whiting Side-Blow Steel Converters, complete with:

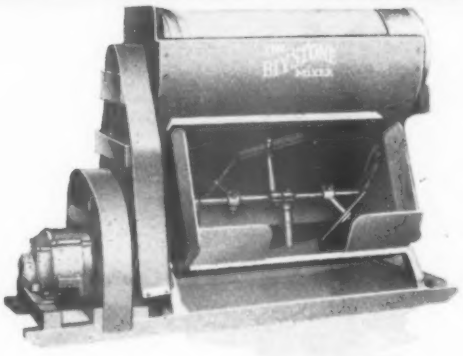
- 2—20" x 30" Heavy Duty Blowers with Motors
- 3—Extra Noses
- 2—Extra Converter Shells
- 2—Extra Stands
- 2—Electric Eye Units
- 2—Photoelectric Pyrometers

• • •

NEW—In crates and on skids. Ordered for use in connection with Navy Ordnance contract, but never set up.

For full information address Box 257 in care of this publication.

BLYSTONE
• MIXERS •



THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for the new Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
549 W. Washington Boulevard, Chicago, Illinois

MURPHY SEPARATOR FILTERS
COMPLETE WATER ELIMINATION
FULLY AUTOMATIC

Trouble Free Operation for Years

Some core blowing machine manufacturers use the Type A as regular equipment. There are cases where 12 machines are operated from one large separator. Whether used for a single machine or for a battery they give 100 percent satisfaction. For Sand Blast purposes they have no equal.

THE MURPHY PISTOL SPRAYER

Thousands in use all over the world. A thirty-three year record of efficiency.

FOUR SIZES

1/8" & 1/4"	$10.00
3/8"	$12.00
1/2"	$15.00

F. O. B. Hamilton, Ohio
Suction Hose & sinker regular equipment

Literature on request

JAMES A. MURPHY & CO.
HAMILTON, OHIO
DRAIN TRAPS — AFTERCOOLERS — SEPARATOR FILTERS

Rawhide PROTECTS

C/R MALLETS AND HAMMERS

permit forceful effective blows without battering, scarring or marring. They protect fine finishes, delicate insulation, hardened parts and costly machinery. They far outlast other mallets, hold a true striking face and, because they absorb recoil, they are less fatiguing on continuous use operations (as pounding in winding, assembly work, etc.). Speed production—reduce spoilage. All sizes. Weighted or unweighted. Hammers take replaceable insert faces.

CHICAGO Rawhide MFG. CO.
1384 Elston Ave. ★ CHICAGO, ILLINOIS

Replacement insert faces for C/R Hammers sold by leading supply houses.

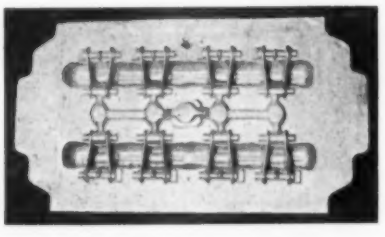
A. A. WICKLAND & CO.

Foundry Engineers

Continuously Since 1919

Designers of modern foundries and manufacturing plants.
Complete engineering service.
Clients of national prominence will attest to our ability.

ENGINEERING BUILDING · CHICAGO
Telephone Dearborn 9344



Quality Precision Pressure-Cast Plates
Cope and Drag Plates · Multiple Core Boxes
MANY YEARS EXPERIENCE IN THIS FIELD
Ask for List of Satisfied Customers—Write for Details

PLASTER PROCESS CASTINGS CO.
6922 Carnegie Ave.—Cleveland, O.

FURNACES (Steel Melting)
American Bridge Co., Pittsburgh, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Hydro-Arc Furnace Corp., 561 Hillgrove Ave., La Grange, Ill.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACE BLOWERS
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

GAGES
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.

GAGGERS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

GANNISTER
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.

GAS (Oxygen, Acetylene, Industrial)
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.

GAS BURNERS
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Mahr Mfg. Co., Div., Diamond Iron Wks. Inc., Minneapolis, Minn.
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.
Surface Combustion Co., Toledo, O.

GLOVES (Industrial, Safety)
American Optical Co., Southbridge, Mass.
Industrial Gloves Co., 203 Garfield Blvd., Danville, Ill.

GLUE
Franklin Glue Co., 1157 Cleveland Ave., Columbus, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.

GOGGLES and EYE PROTECTORS
American Optical Co., Southbridge, Mass.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.
Wahlert Products Corp., 25 Lafayette St., Brooklyn, N. Y.

GRAPHITE
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
J. S. McCormick Co., 25th St. & A.V.R.R., Pittsburgh, Pa.
United States Graphite Co., Saginaw, Mich.

GRINDERS (Electric Portable)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
U. S. Electrical Tool Co., Cincinnati, O.

GRINDERS (Face)
Diamond Machine Co., 2418 Aramingo St., Philadelphia, Pa.

GRINDERS (Flexible Shaft)
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Mall Tool Co., 7720 South Chicago Ave., Chicago, Ill.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago, Ill.

GRINDERS (Pneumatic Portable)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.

GRINDERS (Surface, Bench, Disc, Floor)
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Delta Mfg. Co., Industrial division, 620 E. Vienna Ave., Milwaukee, Wis.
Fox Grinders, Inc., Oliver Bldg., Pittsburgh, Pa.
Hammond Machinery Builders, 1605 Douglas Ave., Kalamazoo, Mich.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Mall Tool Co., 7720 South Chicago Ave., Chicago, Ill.
Safety Grinding Wheel & Mach. Co., Springfield, O.

GRINDERS (Surface, Bench, Disc, Floor) (Cont'd.)
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago, Ill.
U. S. Electrical Tool Co., Cincinnati, O.
Vonnegut Moulder Corp., 1839 Madison Ave., Indianapolis, Ind.

GRINDERS (Swing Frame)
Fox Grinders, Inc., Oliver Bldg., Pittsburgh, Pa.
Mall Tool Co., 7720 South Chicago Ave., Chicago, Ill.
Safety Grinding Wheel & Mach. Co., Springfield, O.
Vonnegut Moulder Corp., 1839 Madison Ave., Indianapolis, Ind.

GRINDING WHEEL DRESSERS
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Simonds Worden White Co., Dayton, O.
Western Tool & Mfg. Co., Springfield, O.

GRINDING MACHINERY
Hammond Machinery Builders, 1605 Douglas Ave., Kalamazoo, Mich.

GRINDING WHEELS—See ABRASIVE WHEELS

GRINDSTONES
Sterling Grinding Wheel Co., Tiffin, O.
Bay State Abrasive Products Co., Westboro, Mass.

GRIT (Abrasive)
Alloy Metal Abrasive Co., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind
American Steel Abrasives Co., Galion, O.
Carborundum Co., Niagara Falls, N. Y.
Globe Steel Abrasive Co., Mansfield, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh, Pa.
Simonds Worden White Co., Dayton, O.

HAMMERS (Chipping)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.
Master Tool Co. Inc., 5605 Herman Ave., Cleveland, O.
Schramm Inc., West Chester, Pa.

HAMMERS (Rawhide)
Chicago Rawhide Mfg. Co., 1384 Elston Ave., Chicago, Ill.

HAND PADS (Leather)
Chicago Rawhide Mfg. Co., 1384 Elston Ave., Chicago, Ill.

HARDNESS TESTING EQUIPMENT
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.
Riehle Testing Mach. Div., American Machine & Metals Inc., East Moline, Ill.

HEAT CONTROL AND RECORDING DEVICES
Foxboro Co., Foxboro, Mass.
Illinois Testing Laboratories, 418 N. LaSalle St., Chicago, Ill.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus, O.

HEAT TREATING SERVICE
Lakeside Steel Improvement Co., 5418 Lakeside Ave., Cleveland, O.

HEATERS (Direct Fired)
Despatch Oven Co., Minneapolis, Minn.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.

HEATERS (Indirect Fired)
Despatch Oven Co., Minneapolis, Minn.

HEATERS (Gas, Oil, Electric)
Despatch Oven Co., Minneapolis, Minn.

HEATERS (Liquid, Steam)
Johnson Corporation, Three Rivers, Mich.

HEATERS (Space, Unit, Oven, Water)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Maehler, Paul, Co., 2200 W. Lake St., Chicago, Ill.

—When writing advertisers, please mention THE FOUNDRY—

CLEANBLAST...

Will do the job!

Serving to increase production is the first requirement for which "CLEANBLAST" was engineered and by thus maintaining production schedules as well as reducing blasting machine maintenance problems America's war effort is definitely helped.

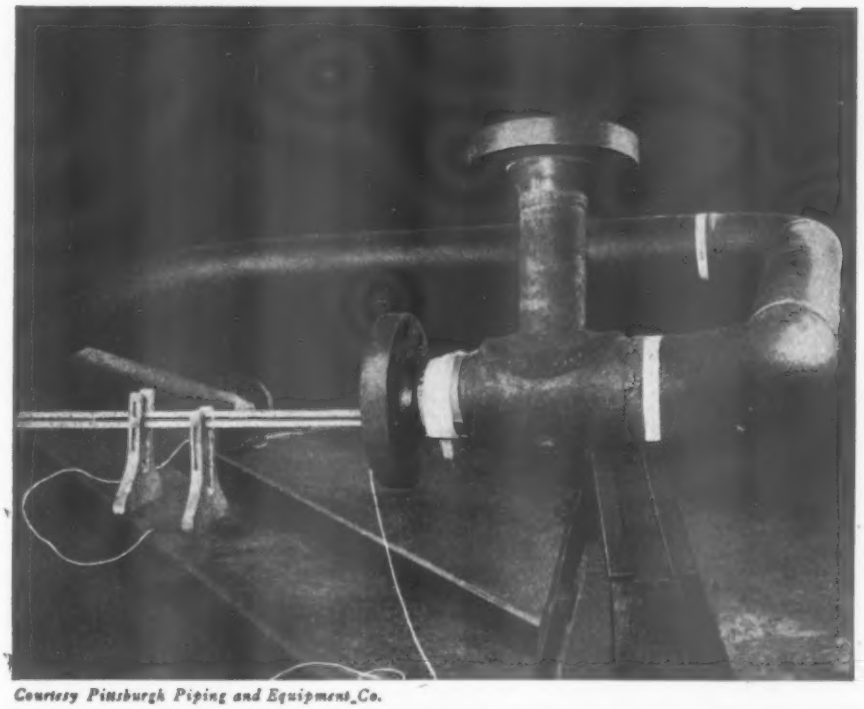
SHOT • GRIT

ALLOY METAL ABRASIVE COMPANY

311 W. HURON ST. ANN ARBOR, MICHIGAN

WAR • PRODUCTION • MUST • NOT • LAG

RADIUM *for* INDUSTRIAL RADIOGRAPHY



Courtesy Pittsburgh Piping and Equipment Co.

The illustration shows radium being used to take a radium-radiograph of a weld. Placing the radium centrally in the pipe and the film on the outside permits of taking a radiograph of the entire circumferential weld with one exposure. This is just one of the many advantages of the use of radium for industrial radiography.

RADIUM MAY BE PURCHASED OR RENTED BY THE DAY, MONTH OR YEAR.

WRITE FOR DETAILS

Pioneers in the Use of Radium for Industrial Radiography

RADIUM CHEMICAL COMPANY, INC. • 570 Lexington Ave., New York (22), N. Y. • Chicago: Marshall Field Annex Bldg.

COULAC
(POWDER)
GLUTRIN
(LIQUID)

WRITE TODAY for booklets containing *practical* information regarding the use of these two
OUTSTANDING SAND BINDERS

ROBESON PROCESS COMPANY
AMERICAN GUM PRODUCTS COMPANY
General Offices:
500 Fifth Ave., New York City

LUMBER!

NORTHERN WHITE PINE
HARD MAPLE · MAHOGANY
WALNUT · CHERRY · CYPRESS
CUT-TO-SIZE CRATING

Manufacturers
SOUTHERN YELLOW PINE
and HARDWOODS
Carload or LCL shipments from our St. Louis yards or direct from our mills.

Thomas & Proetz Lumber Co.
3405 N. HALL STREET ST. LOUIS, MO.

HEAVY BEVEL SAFETY
(Reg. Trade Mark)
LETTERS and FIGURES
Deeper, clean impressions. Will not spall, will not mushroom. Any size character from 1/32" up.

IMMEDIATE DELIVERY
Write for data!
M.E. CUNNINGHAM CO.
SAFETY STEEL STAMPS
97 E. Carson St. Pittsburgh 19, Pa.

HEATERS (Space, Unit, Oven, Water) (Cont'd.)
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

HELMETS (Blasting)
American Foundry Equipment Co., 505 Byrkit St., Mishawaka, Ind.
American Optical Co., Southbridge, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

HELMETS (Welding)
American Optical Co., Southbridge, Mass.
Wahlert Products Corp., 25 Lafayette St., Brooklyn, N. Y.

HOISTS (Air)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.

HOISTS (Chain)
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.

HOISTS (Electric)
American Engineering Co., 2418 Aramingo St., Philadelphia, Pa.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.

HOSE (Air, Blasting, Water, Gas)
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.
Manhattan Rubber Mfg. Div. of Raybestos, Manhattan, Inc., 77 Townsend St., Passaic, N. J.
Pangborn Corp., Hagerstown, Md.
Schramm Inc., West Chester, Pa.

HOSE FITTINGS
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.

HYDRAULIC CLEANING EQUIPMENT
Hydro-Blast Corp., 2550 N. Western Ave., Chicago, Ill.
Pangborn Corp., Hagerstown, Md.
N. Ransohoff, Inc., 208 W. 71st St., Cincinnati, O.

ILLUMINATORS (X-Ray Film)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

IMPACT TESTING MACHINES
Riehle Testing Mach. Div., American Machine & Metals Inc., East Moline, Ill.

IMPREGNATING SYSTEMS (Magnesium Castings)
Empire Varnish Co., 2636 E. 76th St., Cleveland, O.
Jackson & Church Co., Saginaw, Mich.

INGOTS (Nonferrous)
Ajax Metal Co., Philadelphia, Pa.
Aluminum & Magnesium Inc., Sandusky, O.
American Smelting & Refining Co., 120 Broadway, New York
Apex Smelting Co., Chicago, Ill.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Cleveland Electro Metals Co., West 38th St. & NP RR, Cleveland, O.
Federated Metals Div., American Smelting & Ref. Co., New York City.
General Smelting Co., Philadelphia, Pa.
International Nickel Co. Inc., 67 Wall St., New York City.
Jobbins, Wm. F., Inc., Aurora, Ill.
Lavin & Sons, R., Inc., Chicago, Ill.
National Smelting Co., Cleveland, O.
Niagara Falls Smelting & Ref. Co., Buffalo, N. Y.

INGOTS (Nonferrous) (Cont'd.)
Silverstein & Pinsof Inc., 1720 N. Elston, Chicago, Ill.
Sonken-Galamba Corp., Kansas City, Kan.
U. S. Metals Refining Co., New York.
U. S. Reduction Co., E. Chicago, Ind.

INSULATION (Rock Wool)
National Gypsum Co., Buffalo, N. Y.

IRON CEMENT
Smooth-On Mfg. Co., 570 Communipaw Ave., Jersey City, N. J.

IRON ORE
Bethlehem Steel Co., Bethlehem, Pa.
Pickands, Mather & Co., Cleveland, O.

IRON OXIDES
Delta Oil Products Co., Milwaukee, Wis.
Pollard Oil Products Co., 1627 So. 44th St., Milwaukee, Wis.
Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

JACKETS (Mold)
Adams Co., 700 Foster St., Dubuque, Ia.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.

LABORATORY EQUIPMENT (Chemical)
Adolph I. Buehler, 228 N. LaSalle St., Chicago, Ill.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.

LABORATORY EQUIPMENT (Physical)
Adolph I. Buehler, 228 N. LaSalle St., Chicago, Ill.
Dillon, W. C., & Co. Inc., 5410 W. Harrison St., Chicago, Ill.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Norton Co., Worcester, Mass.

LADLES
Bethlehem Steel Co., Bethlehem, Pa.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo, Mich.
Industrial Equipment Co., Minster, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Frederic B. Stevens, Inc., Detroit, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

LADLE HEATERS
Hauck Mfg. Co., 106 Tenth St., Brooklyn, N. Y.

LAYOUT DOPE
Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

LEAD
American Smelting & Refining Co., 120 Broadway, New York

LIMESTONE
Bethlehem Steel Co., Bethlehem, Pa.

LININGS (Mixer Ladles)
Ramtite Company, Div. of S. Obermayer Co., 1803 S. Rockwell St., Chicago, Ill.

LINSEED OIL
Hercules Powder Co., 999 Market St., Wilmington, Del.
Penola Inc., Pittsburgh, Pa.

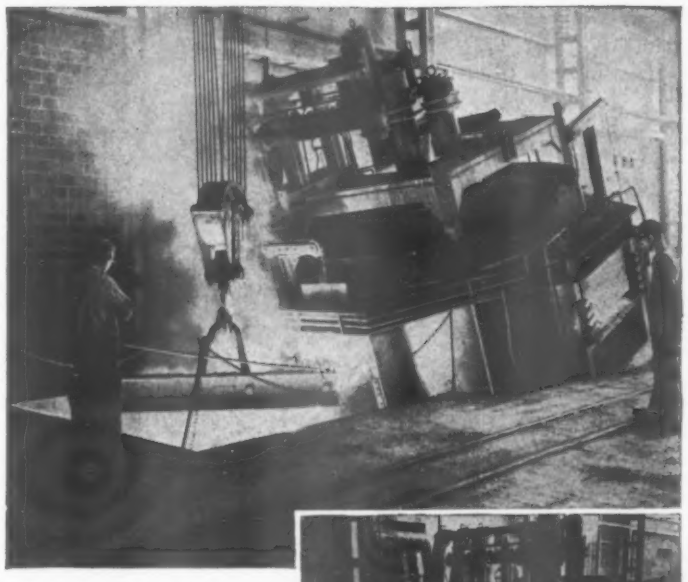
LOAD SKIDDERS
Electric Wheel Co., Quincy, Ill.

LOADERS
Clearfield Machine Co., Clearfield, Pa.
National Engineering Co., 549 W. Washington St., Chicago, Ill.

LUBRICANTS (Industrial)
Penola Inc., Pittsburgh, Pa.
Swan-Finch Oil Corp., R.C.A. Bldg., West, New York.
United States Graphite Co., Saginaw, Mich.

LUBRICATORS (Air Line)
Jas. A. Murphy & Co., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.

—When writing advertisers, please mention THE FOUNDRY—



Floor-mounted, cylindrical shell, Type 20 Heroult Furnace for the production of stainless steel. An all-welded unit designed for charging with an open-hearth charging machine, equipped with rocker type tilting mechanism, and embodying all latest improvements.

Heroult
ELECTRIC FURNACES

AMERICAN BRIDGE Heroult Electric Furnaces now embody novel and distinctive features—the result of constant striving to perfect the most modern and economical tool for efficient melting and refining of iron and steel for castings, high grade alloy, tool and stainless steels.

Dependent on size and operating requirements, they are adaptable to hand, chute, machine or drop-bottom bucket charging. Capacity ratings range from ½ to 100 tons.

Why not avail yourself of the technical knowledge and wide practical experience of our furnace specialists for your specific requirements.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver
Detroit · Duluth · Minneapolis · New York · Philadelphia · St. Louis
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

USS

UNITED STATES STEEL

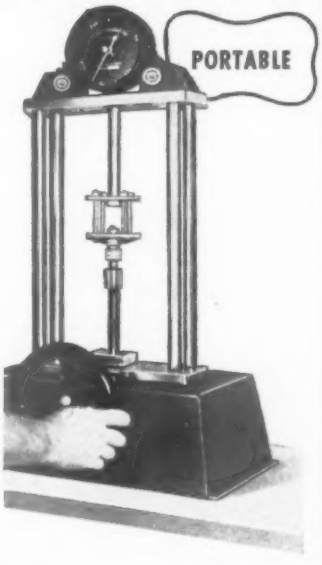
Dillon TENSILE TESTER

★

SERVING:

VULTEE • BELL
CHRYSLER • TALON
WESTINGHOUSE
★
CONSOLIDATED
CURTISS-WRIGHT
GENERAL MOTORS
★
U. S. SIGNAL CORPS
PERUVIAN NAVY
REPUBLIC STEEL

Plus
Scores of Others . . .
Testing Many Materials



10,000 POUNDS CAPACITY

Weight: 83 pounds; height: 32 inches—yet allowing all type stress tests up to 10,000 pounds! **Seven capacities available.** Tests wide range of materials. Extremely accurate, easy to operate, low in cost

Write to Dept. B. F.

W. C. DILLON & CO., INC. 5410 W. HARRISON STREET CHICAGO, ILLINOIS

Type "V"

Here is an Amazing Equation:
(P Stands for Production of Riddled Sand)

(10 MEN WORKING 8 HRS : P) = (1 TYPE "V" RIDDLE WORKING 1 HR. @ 1 CENT)

Yes, the work that ten men can do all day is just about equivalent to the work a Comb's Gyratory Riddle can do in one hour—and operating cost for an hour is roughly one penny. You can test it for yourself—ask for a 30-day free use test; we pay the freight. Comb's Gyratory Riddles come in four types and sizes. Larger sizes are: Type CR, 24" sieve, $215; Type CS, 24" sq. sieve, autom. discharge, $225; Type V-5, Giant Foundry Riddle, 36" sieve, $310. All prices f.o.b. factory. Write for our catalog, then make your selection.

GREAT WESTERN MFG. CO.
(NOT INC.)
Leavenworth, Kansas

DOUBLE YOUR PRODUCTION — with the fastest and most powerful Rammer made —

NO. 4 DAYTON RING VALVE BENCH RAMMER

Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half. Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES. Send for Bulletin No. 300.

DAYTON PNEUMATIC TOOL CO., DAYTON, O.

WILLIAMS *Buckets*

"HOOK-ON" SINGLE LINE

Special Type for

FOUNDRY SERVICE

3/8 to 2 cu. yd. cap.

Send for descriptive bulletin.

THE WELLMAN ENGINEERING CO.
7019 Central Ave. Cleveland, Ohio

***built by* WELLMAN**

TODAY...
MORE THAN EVER

there is a demand for trained foundrymen who can guarantee quality castings—lowest loss—increased production—and quality semi-steel which is possible ONLY when there is a thoro understanding of good melting.

OUR REPORT ON YOUR CUPOLA is worth the fee alone. A cost system will show when you are losing —but will not stop the leaks. Distance is no bar. Write for FREE SYNOPSIS.

McLAIN'S SYSTEM INC.
803 Goldsmith Bldg. Milwaukee, Wis.

MACHINE KEYS
Standard Horse Nail Corp., New Brighton, Pa.

MAGNESIUM (Ingots)
Apex Smelting Co., 2534 Fillmore St., Chicago, Ill.

MAGNETS
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee, Wis.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee, Wis.

MALLETS (Rawhide)
Chicago Rawhide Mfg. Co., 1384 Elston Ave., Chicago, Ill.

MANGANESE (Briquets)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

MATCHPLATES
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit, Mich.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland, O.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland, O.

MAULS
Chicago Rawhide Mfg. Co., 1384 Elston Ave., Chicago, Ill.

METAL CLEANING EQUIPMENT
American Foundry Equipment Co., Mishawaka, Indiana
N. Ransohoff, Inc., 208 W. 71st St., Cincinnati, O.

METAL CUTTING BAND SAWS
Tannewitz Works, Grand Rapids, Mich.

METALLOGRAPHIC EQUIPMENT
Adolph I. Buehler, 228 N. LaSalle St., Chicago, Ill.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.

METALLURGISTS
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago, Ill.

METERS (Gas, Air, Water)
Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago, Ill.
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.

MICROSCOPES
Adolph I. Buehler, 228 LaSalle St., Chicago, Ill.

MITRE SAW BENCHES
Tannewitz Works, Grand Rapids, Mich.

MIXERS (Core Wash)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

MIXERS (Sand and Clay)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Co., Waterloo, Iowa.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

MOISTURE CONTROL FOR DRY BLAST
Surface Combustion Corp., Toledo, O.

MOLD CONVEYORS
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Logan Company, 580 Cabel, Louisville, Ky.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.

MOLD DRYERS
Hauck Mfg. Co., 106 Tenth St., Brooklyn, N. Y.
Mahr Mfg. Co. Div. of Diamond Iron Works Inc., Minneapolis, Minn.

MOLD OVENS and DRYERS
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, O.
Despatch Oven Co., Minneapolis, Minn.
Foundry Equipment Co., Cleveland, O.
Lanly Company, 750 Prospect Ave., Cleveland, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.
Maehler, Paul, Co., 2200 W. Lake St., Chicago, Ill.
Mahr Mfg. Co. Div. of Diamond Iron Works Inc., Minneapolis, Minn.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.

MOLDERS BENCHES
Western Tool & Mfg. Co., Springfield, O.

MOLDING MACHINES
Adams Co., 700 Foster St., Dubuque, Iowa.
Arcade Manufacturing Co., Freeport, Ill.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Berkshire Mfg. Co., 1111 Power Ave., Cleveland, O.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Pioneer Mfg. Co., West Allis, Wis.
S P O Incorporated, 7500 Grand Division Ave., Cleveland, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.

MOLDING MACHINES (Jolt)
Adams Co., 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo, Mich.
Johnston & Jennings Co., 867 Addison Rd., Cleveland, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
S. P O Incorporated, 7500 Grand Division Ave., Cleveland, O.

MOLDING MACHINES (Rollover)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland, O.

MOLDING MACHINES (Squeeze)
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.
Adams Company, 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland, O.

—When writing advertisers, please mention THE FOUNDRY—

BINDARENE

BINDARENE 33D YEAR

LIQUID-FLOUR FOR FOUNDRY CORES, FACINGS AND SPRAYS

★ Immediate shipment.

★★ Moderate and stable prices.

★★★ May be used as extender or to replace hard-to-get binders.

INTERNATIONAL PAPER CO.

BINDARENE SALES DIVISION — 220 E. 42d STREET, NEW YORK (17)

SPEED UP YOUR CORE BAKING!

BLODGETT "B & M" Industrial OVEN

These practical, versatile, rugged ovens are helping cut production time in core-baking, heat treating, enamelling and a host of other processes in plants all over the country.

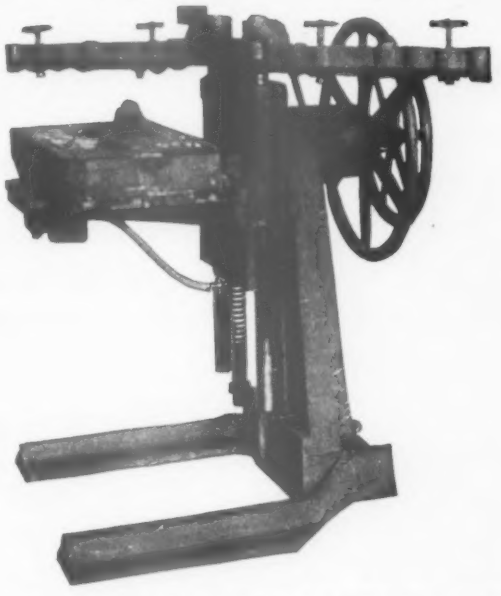
Low in price and promptly delivered, the Blodgett "B & M" industrial ovens offer these features; Shelf loading· Compact · Strap iron or solid shelves, spaced to provide clearances desired · Center-opening swing doors · Removable shelves · Shelf fittings to specification · Sturdy construction · 3" Fiberglas insulation · Automatic control on gas-fired model · Three standard sizes.

Write Today for Descriptive Literature.

The G. S. BLODGETT CO., Inc. Burlington Vermont

MODEL C-414

for Magnesium Molding



The machine illustrated is the Model C-414 in pattern drawn position. Capacity of flasks 36 x 46. This machine is being widely used for the accelerated magnesium castings production.

Write for Details . . . Also Ask About Our

SAND MIXERS, CORE OVENS, WEIGHING and METERING EQUIPMENT

GRIMES MOLDING MACHINE COMPANY

1429 Virginia Park — Detroit 6, Mich.

SILICA BRICK
FIRE BRICK
SLEEVES
NOZZLES
RUNNER BRICK
HOT TOPS
FIRE CLAY &
SILICA CEMENT

SINCE
1856

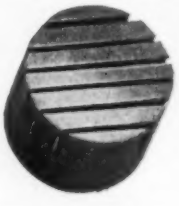
Pioneer
Manufacturers
of
Refractory
Products

HAWS REFRACTORIES COMPANY
JOHNSTOWN, PENNSYLVANIA

DETROIT, MICH.
General Motors Building. Phone: Trinity 1-1140

PITTSBURGH, PA.
Farmers Bank Building. Phone: Atlantic 1656

PATTERN,
FLASK,
CRATING
LUMBER
Phone Diamond 1200
Highest Quality—Any Quantity
DOUGHERTY LUMBER CO.
4306 E. 68TH ST. · CLEVELAND, O.



SMILLIE
CORE BOX VENTS
FOR BLOWING CORES
Head of vent may be machined to fit any contour without removal from plate. Sizes: 1/8" to 1" in 1/16" steps.
WRITE FOR DESCRIPTIVE LITERATURE
C. M. SMILLIE & CO.
1100 Woodward Heights Blvd.
FERNDALE, MICHIGAN

MOLDING MACHINES (Squeeze) (Cont'd.)

Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland, O.

MOLDING SANDS

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Ottawa Silica Co., Ottawa, Ill.

MOLD WASH

Dayton Oil Co., Dayton, O.
Delta Oil Products Co., Milwaukee, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Pollard Oil Products Co., 1627 So. 44th St., Milwaukee, Wis.
United States Graphite Co., Saginaw, Mich.

MOLYBDENUM

Molybdenum Corporation of America, Pittsburgh, Pa.

MONORAIL SYSTEMS

American Monorail Co., 13104 Athens Ave., Cleveland, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

MOTOR CONTROL

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS (Electric)

Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.
Master Electric Co., Dayton, O.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NAILS (Chill)

Bethlehem Steel Co., Bethlehem, Pa.
Capewell Mfg. Co., Hartford, Conn.
Republic Steel Corp., Cleveland, O.

NICKEL

International Nickel Co. Inc., 67 Wall St., New York City.

NOZZLES (Blasting)

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Norton Co., Worcester, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

OIL BURNERS

Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 300 W. Adams St., Chicago, Ill.

OILERS

Jas. A. Murphy & Co., Hamilton, O.
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.

OPTICAL PYROMETERS

Adolph I. Buehler, 228 N. LaSalle St., Chicago, Ill.

OVENS (Annealing and Heat Treating)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, O.
Despatch Oven Co., Minneapolis, Minn.
Electric Furnace Co., Salem, O.
Foundry Equipment Co., Cleveland, O.
Lindberg Engineering Co., 2448 West Hubbard, Chicago, Ill.
Maehler, Paul, Co., 2200 W. Lake St., Chicago, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., Dept. F8, Minneapolis, Minn.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York

OVENS (Annealing and Heat Treating) (Cont'd.)

Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.
Young Brothers Co., 6508 Mack Ave., Detroit, Mich.

OVENS (Core) (See CORE OVENS)

OVENS (Enameling, Japanning)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, O.
Despatch Oven Co., Minneapolis, Minn.
Electric Furnace Co., Salem, O.
Maehler, Paul, Co., 2200 W. Lake St., Chicago, Ill.
R. C. Mahon Co., 8650 Mt. Elliott Ave., Detroit, Mich.
McCann Furnace Co., 5005 Euclid Ave., Cleveland, O.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York
Young Brothers Co., 6508 Mack Ave., Detroit, Mich.

OVENS (Mold)

Despatch Oven Co., Minneapolis, Minn.

OXYGEN

Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.

PARTING COMPOUNDS

Buckeye Products Co., 7022 Vine St., Cincinnati, O.
Delta Oil Products Co., Milwaukee, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
National Gypsum Co., Buffalo, N. Y.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland, O.
Frederic B. Stevens, Inc., Detroit, Mich.
Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

PATTERN COATING (Rubber)

Foundry Rubber Compounds Corp., 1050 Thirtieth St., N. W., Washington, D. C.

PATTERN COMPOUND

Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

PATTERN LETTERS

Freeman Supply Co., Toledo, O.

PATTERN LUMBER

Dougherty Lumber Co., Cleveland, O.
Freeman Supply Co., Toledo, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Thomas & Proetz Lumber Co., 3400 N. Hall St., St. Louis, Mo.

PATTERN PLATES

Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit, Mich.
Freeman Supply Co., Toledo, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.
Marathon Chemical Co., Div., Marathon Paper Mills Co., Rothschild, Wis.
Moltrup Steel Products Co., Beaver Falls, Pa.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland, O.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland, O.

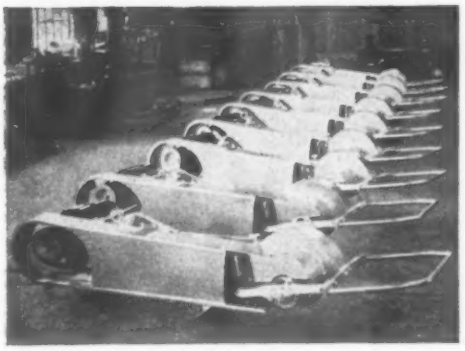
PATTERN PLATE STOCK

Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Marathon Chemical Co., Div., Marathon Paper Mills Co., Rothschild, Wis.

PATTERN SHOP EQUIPMENT

Buss Machine Works, 8th & Washington Sts., Holland, Mich.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Delta Mfg. Co., Industrial Division, 620 E. Vienna Ave., Milwaukee, Wis.
Do All Company, Des Plaines, Ill.
Freeman Supply Co., Toledo, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.

Fox . . . MAINTAINS HIGHEST PRODUCTION SCHEDULES TO MEET YOUR NEEDS



FOX
SWING FRAME
AND STAND
GRINDERS

●

This lineup of Fox Swing Frame and Stand Grinders gives some indication of our effort to maintain production schedules to meet your needs for this outstanding product. The ruggedness and precision engineered into these grinders assures you uninterrupted, round-the-clock performance. We are producing more and more Fox Grinders daily and can assure prompt delivery. Write for complete information.

FOX GRINDERS, INC.
OLIVER BUILDING
PITTSBURGH, PA., U. S. A.

BURNS CAUSE ABSENTEEISM

a Simple Solution . . .

cōfēn for BURNS

Manufactured and Sold by

LEE-WOOD, Inc.
SOUTH NORWALK . CONN.

A.B.C. FOUNDRATES
Reg. Trade-Mark

SCIENTIFICALLY BLENDED

FLUXES

Widely Used for Treating:

- ALUMINUM ALLOYS
- BRASSES
- BRONZES
- COPPER ALLOYS
- NICKEL ALLOYS
- GREY IRON

A. B. C. Foundrates:

- PROTECT
- REFINE
- PURIFY
- DEGASS

Also Recommended for Recovering Good Metal from

- SKIMMINGS
- TURNINGS
- DROSSES

Our metallurgists will give technical advice on the use of A.B.C. Foundrates in your plant. Submit your problem, or write for further information. Address: Dept. F.

●

American-British Chemical Supplies, Inc.
180 Madison Avenue, New York
Telephone: AShland 4-2265

Who Said "Pink Tea" ?

Not us, Brother—we know better. That's why the wheels we build and recommend for foundry service are tough and stamina-built. They can take hard going and glory in it. But —there's nothing awkward about them. They are round, true and about as friction-free as roller bearings can make anything that's mobile. Nor have we overlooked the abrasive grits that commonly chew up bearings in a short time. NU-SEAL takes care of that—by keeping the grease IN and the grit OUT. It will pay you to drop us a line. Investigate these better wheels. Available with pneumatic, cushion (puncture-proof) or solid rubber tires for those who can qualify — or — all-metal wheels if desired.

Write TODAY for CATALOG 3M

FRENCH & HECHT, INC.
DAVENPORT, IOWA
WHEEL BUILDERS SINCE 1888

ENGINEERING SERVICE

FOUNDRY PLANT LAYOUTS AND BUILDING PLANS
DESIGN OF SPECIAL FOUNDRY MACHINERY AND EQUIPMENT
APPRAISALS AND SURVEYS
LIQUIDATION OF SURPLUS PLANT

WALTER GIELE CO.
Engineers . . . Foundry Specialists
FIRST NATIONAL BANK BUILDING, LEBANON, PA.
WALTER S. GIELE, M. E. — REGISTERED PROFESSIONAL ENGINEER
TELEPHONE LEBANON 1200

CHAMPION MOLDERS BENCH

Furnished with or without vibrator

THE WESTERN TOOL & MFG. CO., SPRINGFIELD, OHIO

PATTERN SHOP EQUIP'T. (Cont'd.)
Oliver Machinery Company, Grand Rapids, Mich.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago, Ill.

PATTERN SHOP SUPPLIES
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.

PATTERNS (Wood, Metal)
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton, O.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit, Mich.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland, O.

PETROLEUM COKE
Republic Coal & Coke Co., 8 S. Michigan Ave., Chicago, Ill.

PHOTOGRAPHIC EQUIPMENT
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago, Ill.

PIG IRON
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
E. & G. Brooke Iron Co., Birdsboro, Pa.
Globe Iron Co., Jackson, O.
Hanna Furnace Co., Div. of National Steel Corp., Ecorse, Detroit, Mich.
Hickman-Williams & Co., Cleveland, O.
Pickands, Mather & Co., Cleveland, O.
Republic Steel Corporation, Cleveland, O.
Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)
Bethlehem Steel Co., Bethlehem, Pa.
Globe Iron Co., Jackson, O.
Jackson Iron & Steel Co., Jackson, O.

PINS (Flask)
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

PISTON RINGS (for Molding Machines, Compressors, etc.)
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.

PLASTIC METAL
Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

PLATES (Bottom)
Adams Co., 700 Foster St., Dubuque, Iowa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

PLATES (Core Drying)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Johns-Manville, 22 East 40th St., New York City.

PLUMBAGO
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
J. S. McCormick Co., 25th St. & A.V.R.R., Pittsburgh, Pa.
Frederic B. Stevens, Inc., Detroit, Mich.
United States Graphite Co., Saginaw, Mich.

PNEUMATIC TOOLS
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

PNEUMATIC TOOLS (Cont'd.)
Master Tool Co. Inc., 5605 Herman Ave., Cleveland, O.
Schramm Inc., West Chester, Pa.

POLISHING MACHINERY
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago, Ill.

POLISHING MACHINERY (Cont'd.)
Hammond Machinery Builders, 1605 Douglas Ave., Kalamazoo, Mich.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago, Ill.

POURING DEVICES
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

POWDERED COAL EQUIPMENT
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

PRESSER BOARDS
Adams Co., 700 Foster St., Dubuque, Iowa.

PRESSURE CASTING SEALER
Empire Varnish Co., 2636 E. 76th St., Cleveland, O.

PROTECTIVE MATERIALS (X-Ray)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

PULLEYS (Magnetic)
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee, Wis.

PUMPS
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Construction Machinery Co., Waterloo, Iowa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS (Dry, Vacuum)
Fuller Company, Catasaqua, Pa.

PURIFIERS
Cleveland Flux Co., 1026 Main St., Cleveland, O.

PUSH-OFF MACHINES
Champion Foundry & Machine Co., 1314 West 21st St., Chicago, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
Worthington Pump & Machy. Corp., Harrison, N. J.

PYROMETERS
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.
Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus, O.
Pyrometer Instrument Co., 106 Lafayette St., New York
Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

RADIOGRAPHY (Industrial)
Canadian Radium & Uranium Corp., Radium Chemical Co. Inc., 630 Fifth Ave., New York City. 570 Lexington Ave., New York, N. Y.

RADIUM
Canadian Radium & Uranium Corp., 630 Fifth Ave., New York City.
Radium Chemical Co. Inc., 570 Lexington Ave., New York, N. Y.

RAMMERS
Master Tool Co. Inc., 5605 Herman Ave., Cleveland, O.

REFRACTORIES
Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., Cleveland, Ohio.
Eastern Clay Products, Inc., Elfort, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo, N. Y.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago, Ill.
Haws Refractories Co., Johnstown, Pa.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester, Mass.
Ramtite Company, Div. of S. Obermayer Co., 1803 S. Rockwell St., Chicago, Ill.
Chas. Taylor Sons Co., P.O. Box 58, Annex Sta., Cincinnati, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United States Graphite Co., Saginaw, Mich.

REGULATORS (Pressure)
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.

REPAIR PARTS (Molding Machine)
Pioneer Mfg. Co., West Allis, Wis.

RESPIRATORS
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.
Wahlert Products Corp., 25 Lafayette St., Brooklyn, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

"MAKE YOUR WINTER CHECK UP NOW!"

Check your abrasives right now! If you are using "CERTIFIED" Steel Shot and Grit—you'll get a clean bill of health for your effort. In spite of the great demands of war production the checks on these two famous workers in the cleaning industry are greater than ever. Both have tremendous war work to do. They are heat-treated right—for toughness and hardness. They are one abrasive team really "fit" for the hardest job.

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

"FALLS" BRAND

FLUXES

★

ANTI-PIPING COMPOUND
FALLS FLUX "A" FOR ALUMINUM
FALLS FLUX "B" FOR BRASS

★

Have you written for your copy of our book
THE HOW & WHY OF "FLUXES"
It's free for the asking

★

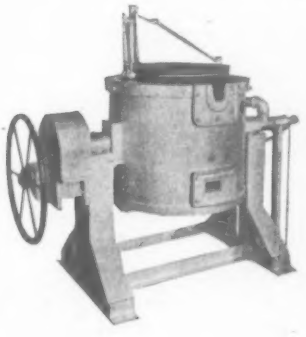
America's Largest Producer
Annual Capacity 70 Million Pounds

★

NIAGARA FALLS SMELTING & REFINING CORPORATION
Buffalo 17, New York

NOW BETTER THAN EVER

THE NEW *Improved* MONARCH FURNACE



FEATURES

1. All Welded Steel Construction.
2. Roller Bearings—Optional.
3. Cut Gears Running in Oil in Enclosed Housing.
4. Shell and Bottom Re-inforced with Steel Bands and T-irons.
5. Proper Height to Pour into Ladle.
6. Choice of Linings for Low Operating and Maintenance Costs.

Other Types—Pot and Crucible

Motorized Nose Pour — Soft Metal
Double Chamber — Simplex (Open Flame)
Core Ovens

MONARCH ENG. & MFG. CO.
(Since 1904)

Curtis Bay — Baltimore-26, Md.

TIECO

FOUNDRY LADLES

TIECO geared ladles eliminate binding or sticking gear troubles. This patented feature assures accurate pouring and long life, due to the absence of drops and jerks and all trouble due to distortion or springage of the Bail or Bowl or both, caused by heat is removed. TIECO Ladles come in all types and sizes and are furnished for manual or electric operation.

Write for descriptive literature.

THE INDUSTRIAL EQUIPMENT COMPANY

115 OHIO STREET · MINSTER, OHIO

POLLY BRAND

Stands for Strength

POLLY

HI-TEMP COTE

(HIGH TEMPERATURE)

CORE & MOLD WASH

ADOPTED EXCLUSIVELY BY MANY PROGRESSIVE FOUNDRIES

Order Trial Today

POLLARD

OIL PRODUCTS COMPANY

1627 SOUTH 44th ST. MILWAUKEE, WIS.

SCIENTIFIC MATCH PLATES

Pressure Cast

You GET

True Reproductions. Accurate Partings. Lower Plate Cost.

You SAVE

Expensive Pattern Duplication. Excessive Cleaning Costs

You AVOID

Center Shrinks, Draws at Parting

The SCIENTIFIC CAST PRODUCTS Corp.

CLEVELAND, O. CHICAGO, ILL.

RIDDLES
Buffalo Wire Works., 425 Terrace, Buffalo, N. Y.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia, Pa.

RIDDLES (Electric)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago, Ill.
Great Western Mfg. Co., Leavenworth, Kans.

RIDDLES (Hand)
Buffalo Wire Works Co., 425 Terrace, Buffalo, N. Y.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

RIDDLE BOTTOMS (Gyratory)
Buffalo Wire Works Co., 425 Terrace, Buffalo, N. Y.

RODS (Steel)
Republic Steel Corp., Cleveland, O.

ROD STRAIGHTENER
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.

ROLLER-HEARTH FURNACES (Electric Annealing)
General Electric Co., Schenectady, N. Y.

RUBBER LINING MATERIAL (Abrasive Resisting)
Pangborn Corp., Hagerstown, Md.

RUST PREVENTATIVES
Penola Inc., Pittsburgh, Pa.

SAFETY CLOTHING
American Optical Co., Southbridge, Mass.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.
Wahlert Products Corp., 25 Lafayette St., Brooklyn, N. Y.

SALT and SALT TABLETS
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.

SANDS (Core, Molding, Blasting)
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Ottawa Silica Co., Ottawa, Ill.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Producers Core Sand Corp., Michigan City, Ind.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

SAND BLAST BARRELS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.
W. W. Sly Mfg Co., 4753 Train Ave., Cleveland, O.

SAND BLAST CABINETS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.

SAND BLAST EQUIPMENT
American Air Filter Co., 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
Ruemelin Mfg. Co., 3850 North Palmer St., Milwaukee, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.
W. W. Sly Mfg. Co., 4753 Train St., Cleveland, O.

SAND BLAST NOZZLES
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Norton Company, Worcester, Mass.

SAND BLAST NOZZLES (Cont'd.)
Pangborn Corp., Hagerstown, Md.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee, Wis.
Stoody Co., 1139 W. Slauson Ave., Whittier, Calif.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

SAND BLAST ROOMS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
Ruemelin Mfg. Co., 3850 North Palmer St., Milwaukee, Wis.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

SAND BLAST TABLES
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.

SAND CONTROL and TESTING EQUIPMENT
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.
National Engineering Co., 549 W. Washington St., Chicago, Ill.

SAND CONVEYING and HANDLING EQUIPMENT
American Air Filter Co., 266 Central Ave., Louisville, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The 2541 N. Keeler Ave., Chicago, Ill.
Clearfield Machine Co., Clearfield, Pa.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Penn Iron Works, Reading, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

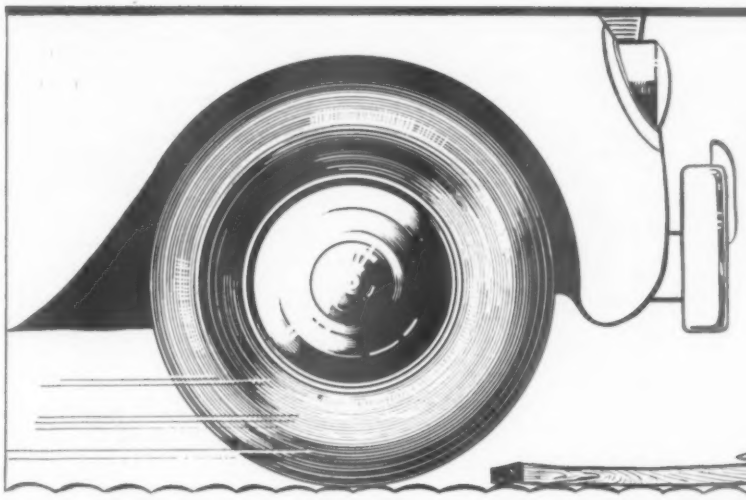
SAND CONVEYING and HANDLING EQUIPMENT (Pneumatic)
Ajax Flexible Coupling Co., Westfield, N. Y.
Fuller Company, Catasaqua, Pa.
Robins Conveyors Inc., Passaic, N. J.

SAND DRYERS
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Pangborn Corp., Hagerstown, Md.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SAND MEASURING and WEIGHING DEVICES
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.

SAND MIXERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The 2541 N. Keeler Ave., Chicago, Ill.
Blystone Division Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

SAND PREPARATION EQUIPMENT
Ajax Flexible Coupling Co., Westfield, N. Y.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.



YOU CAN EXPECT FREE AND RAPID VENTING . . .

. . . when you use Buffalo Brand Vent Wax in your cores. Good venting saves countless cores and helps guarantee castings . . . and the cost of **BUFFALO BRAND VENT WAX** *is so low (a few pennies per casting) no foundry can afford to be without it. Ask your dealer, or write to us for samples.*

UNITED COMPOUND CO.

BUFFALO, N. Y.

BORIUM NOZZLES *Maintain* BLAST CLEANING VELOCITY

BLAST CLEANING EFFICIENCY is quickly lost with cast iron nozzles because of rapid aperture wear. As nozzles cut away, velocity and cleaning ability fall off rapidly, efficient pattern is lost, and compressor wear increases.

BORIUM NOZZLES are specially designed to reduce nozzle failures! Lined with tungsten carbide, the hardest known commercial metal, Borium Nozzles possess the ultimate resistance to wear, retain a nearly uniform hole size throughout their life, maintain high air-stream velocity with less compressor operation, and confine the spray pattern to a concentrated, efficient blast of fast cutting particles!

BORIUM NOZZLES are guaranteed for a minimum 300 hours' service—often last up to 600 hours! Cost as little as 2⅔¢ per hour to operate.

Made in screw and flanged types in standard sizes. Available through Stoody distributors located in all principal cities. Write for folder!

STOODY COMPANY • 1139 W. Slauson, Whittier, California

STOODY HARD-FACING ALLOYS
Stop wear . . . Eliminate Repair

"Oliver" No. 299
SINGLE SURFACE PLANER
24" by 8"

COMPACT
EFFICIENT

This sturdy, precision built planer is an asset to any pattern shop. It feeds at any rate from 18 to 40 feet per minute, at the turn of a dial. Revolving parts are enclosed for safety and the exclusion of dirt. Controls are centrally located for ease of operation and efficiency. Let us tell you the complete story of this fine equipment.

Complete pattern shop equipment—write for full information

OLIVER MACHINERY CO.

GRAND RAPIDS, MICH.

FOUNDRY MIXERS

Fast, dependable core sand Mixers. Triple mixing hoes assure thorough action. Flared drum for quick easy charging and discharge. Available with replaceable full hard abrasion resisting drum liner at slight extra cost.

WRITE FOR INFORMATION AND LITERATURE ON

CMC FOUNDRY MIXERS
CARTS, BARROWS AND
TIPOVER BUCKETS

• *For Sale By Leading Dealers Everywhere* •

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

FOR FASTER PRODUCTION
Use HAUCK

CUPOLA LIGHTERS
MOLD DRYERS
LADLE HEATERS
FURNACE BURNERS

Portable Suction and Compression Oil Burners; Core Oven and Furnace Oil Burners for every foundry. Write for Catalogs.

HAUCK MANUFACTURING CO., 106 Tenth St., Brooklyn, N. Y.

BERKSHIRE
Jolt Squeeze
MOLDING MACHINES

Model H Jolt Squeeze

CANNON AIR VIBRATORS

10" SQUEEZE CYLINDER

4" JOLT CYLINDER

CANNON VIBRATOR CO. • 1111 Power Ave. Cleveland, Ohio • **BERKSHIRE MFG. CO.**

SAND PREPARATION EQUIPMENT (Cont'd.)
Clearfield Machine Co., Clearfield, Pa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit, Mich.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SAND RAMMERS
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.
Dayton Pneumatic Tool Co., Dayton, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
Master Tool Co. Inc., 5605 Herman Ave., Cleveland, O.

SAND RECLAIMERS
Hydro-Blast Corp., 2550 N. Western Ave., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee, Wis.

SAND SIFTING and SCREENING MACHINERY
American Air Filter Co., 266 Central Ave., Louisville, Ky.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

SAND STORAGE BINS & GATES
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Neff & Fry, Camden, O.

SANDING MACHINERY
Delta Mfg. Co., Industrial division, 620 E. Vienna Ave., Milwaukee, Wis.
Oliver Machinery Company, Grand Rapids, Mich.

SAW (Band, Metal, Wood)
Delta Mfg. Co., Industrial division, 620 E. Vienna Ave., Milwaukee, Wis.
Oliver Machinery Company, Grand Rapids, Mich.

SAWS (Cold Metal)
Bethlehem Steel Co., Bethlehem, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.

SCALES
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

SCALING HAMMERS
Dayton Pneumatic Tool Co., Dayton, O.
Master Tool Co. Inc., 5605 Herman Ave., Cleveland, O.
Schramm Inc., West Chester, Pa.

SCHOOLS (Correspondence)
McLain's System, Inc., Goldsmith Bldg., Milwaukee, Wis.

SCREENS (Shake-Out)
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Sifting)
Buffalo Wire Works Co., 425 Terrace, Buffalo, N. Y.

SCREENS (Vibrating)
Ajax Flexible Coupling Co., Westfield, N. Y.
Robins Conveyors Inc., Passaic, N. J.

SEA COAL
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Smith Facing & Supply Co., 1837 Carter Rd., Cleveland, O.
Frederic B. Stevens, Inc., Detroit, Mich.

SEPARATORS (Abrasive)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.

SEPARATORS (Air, Moisture, Oil)
American Air Filter Co., 266 Central Ave., Louisville, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Johnson Corporation, Three Rivers, Mich.
Jas. A. Murphy & Co., Hamilton, Ohio.
Pangborn Corp., Hagerstown, Md.
Claude B. Schneible Co., 3953 Lawrence Ave., Chicago, Ill.

SEPARATORS (Magnetic)
Ajax Flexible Coupling Co., Westfield, N. Y.
Beardsley & Piper Co., The 2541 N. Keeler Ave., Chicago, Ill.
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee, Wis.

SHAKE-OUT MACHINERY
Ajax Flexible Coupling Co., Westfield, N. Y.
American Air Filter Co., 266 Central Ave., Louisville, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.
Robins Conveyors Inc., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOT and GRIT
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Globe Steel Abrasive Co., Mansfield, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Hickman-Williams & Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Pittsburgh Crushed Steel Co., Pittsburgh, Pa.
Parsons Engineering Corp., Cleveland, O.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.
Steel Shot & Grit Co. Inc., 39 Warren Ave., Boston, Mass.

SHOVELS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Frederic B. Stevens, Inc., Detroit, Mich.

SILICA FLOUR
Ottawa Silica Co., Ottawa, Ill.

SILICON (Briquets)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

SILICON CARBIDE (Briquets)
Carborundum Co., Niagara Falls, N. Y.

SKIMMER BARS
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.

SKIMMERS
Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.

SKIP HOISTS
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
National Engineering Co., 549 W. Washington St., Chicago, Ill.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

—When writing advertisers, please mention THE FOUNDRY—

ESTABLISHED 1788

THE E. & G. BROOKE IRON COMPANY

◆

Manufacturers of

Basic, Malleable, Foundry, Forge and Low Phosphorus Pig Iron

◆

BIRDSBORO, PENNSYLVANIA

PENN DUMPING BUCKETS

No. 5-A

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Careful construction prevents "clinging" makes them easily emptied.

WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS
READING, PENNA.

This
DIFFERENT TYPE VENTILATING UNIT*
installs in the Duct

REGULAR DUCT
Ventilation of hazardous fumes and corrosive gases is assured with this efficient DeBothezat Bifurcator. Its compact design conserves corrosion resisting metal alloys.
BIFURCATOR* IN DUCT
Bifurcator is installed just like a section of ductwork. This eliminates elbow bends and supporting platforms. DeBothezat Bifurcators can readily be installed in ducts that run at any angle from horizontal through vertical.
MOTOR ISOLATED FROM AIR STREAM
Motor is completely isolated from fumes. Air stream is bifurcated or bypassed around the motor chamber which is open to atmosphere at both ends. Motor is protected against burning out by the non-overloading characteristic of DeBothezat's axial-flow fan.
FREE BOOK!
Shows Bifurcator sizes and capacities. Send for your copy.
DeBOTHEZAT BIFURCATOR

De Bothezat Bifurcators*

DE BOTHEZAT DIVISION of AMERICAN MACHINE AND METALS, INC.
EAST MOLINE, ILLINOIS

For dry, clean, oil free COMPRESSED AIR

USE THIS 2-WAY SEPARATOR

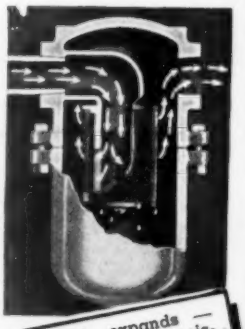
WATER, dirt and oil have no place in compressed air. They deteriorate air hoses and equipment rapidly, besides causing imperfect results in many services.

The Johnson Gast Separator combines the two most effective methods of removing these objectionable substances. First the air is allowed to expand, precipitating most of the moisture. Then it passes through the "thousand baffles", changing direction of flow many times and surrendering particles of water and dirt at every turn.

When water has been vaporized by the heat generated in compressing air, the Johnson Gast Aftercooler is installed ahead of the separator to condense the vapor. For services where every trace of oil must be removed—as in paint spraying—the Johnson Gast Oil Absorber is used.

Write for Bulletin

THE JOHNSON CORPORATION
870 Wood St., Three Rivers, Mich.



1. Air expands — precipitates moisture.
2. "Thousand Baffles" change flow direction—capture remaining water and dirt.

Johnson Gast Separators also available for use on steam lines.

JOHNSON-GAST
SEPARATORS • AFTERCOOLERS • OIL ABSORBERS

For Better Blown Cores, Use
DEMMLER CORE BOX VENTS

PERFORATED VENTS
No. 00, No. 0, No. 1 or No. 2 holes

SLOTTED VENTS
Brass or Steel
Slots .010" to .015"

WM. DEMMLER & BROS.
Kewanee - Illinois

BOOKS

On Metallurgy, Iron and Steel Practice, Foundry Work, etc.

We speciaiize in books of interest to our readers, and will be glad to advise you about the best book for your particular needs.

THE FOUNDRY
Penton Building *Book Dept.* **Cleveland, Ohio**

SLIP FLASKS
Adams Co., 700 Foster St., Dubuque, Iowa.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, Ohio

SLIP JACKETS
Adams Co., 700 Foster St., Dubuque, Ia.,
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland, O.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland, O.

SMELTERS & REFINERS
American Smelting & Refining Co., 120 Broadway, New York
Bohn Aluminum & Brass Corp., 1400 Lafayette Bldg., Detroit, Mich.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS
Adams Co., 700 Foster St., Dubuque, Ia.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.

SODA ASH
Hercules Powder Co., 999 Market St., Wilmington, Del.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit, Mich.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York, N. Y.

SOLDER
American Smelting & Refining Co., 120 Broadway, New York

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.

SPRAYERS (Pistol)
Jas. A. Murphy & Co., Hamilton, Ohio.

SPRAY GUNS
Jas. A. Murphy & Co., Hamilton, Ohio.
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.

SPRUE CUTTERS
Adams Co., 700 Foster St., Dubuque, Iowa.
Freeman Supply Co., Toledo, O.
Scully Machinery & Equip. Corp., 2031 W. 74th St., Chicago, Ill.

STAMPS & HOLDERS (Steel)
M. E. Cunningham Co., 97 E. Carson St., Pittsburgh, Pa.

STARS (Tumbling)
W. W. Sly Mfg. Co. 4753 Train Ave., Cleveland, O.

STEEL (High Speed)
Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Structural)
American Bridge Co., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

STEEL WASH
Dayton Oil Co., Dayton, O.

STOKERS
American Engineering Co., 2418 Aramingo Street, Philadelphia, Pa.

STRIPPING MACHINES
Adams Co., 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 West 21st St., Chicago, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.

STRIPPING MACHINES (Cont'd.)
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

SURFACE TREATMENT METALS
N. Ransohoff, Inc., 208 W. 71st St., Cincinnati, O.

TANK TRAPS
Jas. A. Murphy & Co., Hamilton, Ohio.

TAPER PINS
Standard Horse Nail Corp., New Brighton, Pa.

TEMPERATURE CONTROLLERS
Illinois Testing Laboratories, 418 N. LaSalle St., Chicago, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus, O.

TESTING LABORATORIES
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit, Mich.
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago, Ill.

TESTING MACHINERY
Dillon, W. C., & Co. Inc., 5410 W. Harrison St., Chicago, Ill.
Riehle Testing Mach. Div., American Machine & Metals Inc., East Moline, Ill.

THERMOCOUPLES
Illinois Testing Laboratories, 418 N. LaSalle St., Chicago, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus, O.
Tamms Silica Co., 228 N. La Salle St., Chicago, Ill.

TIMERS (Electric)
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.

TIN
American Smelting & Refining Co., 120 Broadway, New York

TONGS
Industrial Equipment Co., Minster, O.

TOOLS (Pneumatic, Portable)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland, O.
Dayton Pneumatic Tool Co., Dayton, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.
Master Tool Co. Inc., 5605 Herman Ave., Cleveland, O.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)
Freeman Supply Co., Toledo, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.

TRACTORS (Gas Powered)
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAILERS (Dump)
Electric Wheel Co., Quincy, Ill.

TRAILERS (Platform)
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Electric Wheel Co., Quincy, Ill.

TRAMRAIL SYSTEMS
American MonoRail Co., 13104 Athens Ave., Cleveland, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

TRAPS (Steam)
Johnson Corporation, Three Rivers, Mich.

TROLLEYS
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

TRUCK CRANES
Automatic Transportation Co., 121 West 87th St., Chicago, Ill.

TRUCKS (Dump)
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.

TRUCKS (Electric-Industrial)
Automatic Transportation Co., 121 West 87th St., Chicago, Ill.

TRUCKS (Power Lift)
Automatic Transportation Co., 121 West 87th St., Chicago, Ill.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRUCK WHEELS
Automatic Transportation Co., 121 West 87th St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
French & Hecht, 523 East 3rd St., Davenport, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

TUBES (X-Ray)
Picker X-Ray Corp., 300 Fourth Ave., New York City.

—When writing advertisers, please mention THE FOUNDRY—

...PENNSYLVANIA...

SEE US FIRST

Which of these binder specialties do you need today?

CERES • PENNITE • KORITE

Cereal BINDER — **Genuine Foundry MOLASSES** — **Core Paste and COMPOUND**

BENTONITE • BINDARENE • FOUNDRY FLOUR

PITCH CORE COMPOUND

It will pay you to let us quote on your other needs, too!

PENNSYLVANIA FOUNDRY SUPPLY & SAND Co.

ASHLAND and E. LEWIS STREETS — PHILADELPHIA, PA. — TELEPHONE, JEFFERSON 1012

One Week to 10 Days

IMMEDIATE DELIVERY

General Centrifugal Blowers

Designed for GAS *and* OIL BURNERS, CORE *and* ANNEALING OVENS, CUPOLAS *and* CRUCIBLE FURNACES

★ **Gas Boosters** ★

Cupola Blowers

WIDE RANGE OF SIZES FOR EVERY REQUIREMENT

★

Send for NEW 8-Page Bulletin CB-101

GENERAL BLOWER COMPANY

406 N. PEORIA ST.—MONROE 0244—CHICAGO, ILL.

120 Liberty St., New York, N. Y. — 7644 Woodward Ave., Detroit, Michigan — 1084 Lakeland Ave., Cleveland, O.

430 Frick Bldg., Pittsburgh, Pa. — 148 North Fourth St., Philadelphia, Pa.

FORESIGHT!

You use COAL in your furnace for warmth.

You use PANGBORN-NORBIDE* Nozzles with blast cleaning equipment for SERVICE and PROFIT.

Lower costs - less shut downs - faster production.

GUARANTEE { 1500 HOURS WITH STEEL ABRASIVES / 750 HOURS WITH SAND

*Trade Mark of Norton Company for Boron Carbide

PANGBORN CORPORATION

The World's Largest Manufacturer of Blast Cleaning and Dust Collecting Equipment

HAGERSTOWN . . . . MARYLAND

Improved Air-O-chek MODEL FA AIRGUN

1. Only AIR-O-CHEKS have the ball and socket joint connecting the enclosed lever to the valve.
2. Long ferrules formed over special shoulders on air gun and fitting reinforce union with hose and seal end of hose against grease or oil.
3. Factory assembly on hose of special quality and weight assures easy operation and long, trouble-free service.

There's a reason for AIR-O-CHEK *leakproof operation and long, trouble-free service.* It's the *ball and socket joint connecting the enclosed lever to the valve,* thus providing proper leverage to open the valve with a slight flex of the hose—*no* other air gun or blow gun has this feature.

Until you've used AIR-O-CHEK Air Guns *you can't appreciate the easy, positive, almost magic operation* that saves air and time and maintenance.

AIR-O-CHEKS are precision machined from bar brass and stainless steel. Made in sizes and types for all requirements. Write for literature.

AIR-WAY PUMP & EQUIP. CO., 405 S. Jefferson St., Chicago 7, Ill.

HARDWOOD WEDGES

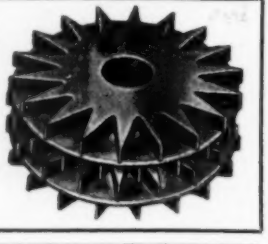
Immediate shipment out of stock on most regular sizes.
Write for prices—
We make ALL TYPES of hardwood wedges!
HALEY MFG. CO., CENTERVILLE, IND.

WOOD FLOUR

ACE FOUNDRY MATERIALS CO.
14862 FORRER STREET
DETROIT 27, MICHIGAN

Grinding Wheel Dressers

■ We manufacture the only complete line of dressers and cutters. Write for copy of catalog "F" and name of your nearest dealer.



DESMOND-STEPHAN MFG. CO.
Urbana, Ohio
Canadian D. S. Mfg. Co., Hamilton, Ont.

Save Fingers with Steel-Grip Finger Guards

War factories are saving time and injuries by protecting workers with Steel-Grip Finger Guards. For handling rough or sharp articles, for buffing, grinding, sanding, polishing, punch press work and hundreds of other jobs. Protect fingers or thumb, front or back, from cuts, abrasions, blisters. Durable leather, elastic web back for snug, cool, comfortable fit. Easy on and off. One size fits men or women. Send 10c each for samples or trial box of 50 at 8½c each, less 10%.

Safety Catalog FREE

Industrial Gloves Co., 223 Garfield, Danville, Ill.
(*In Canada: Safety Supply Co., Toronto*)

STEEL GRIP

TUMBLING BARRELS
Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland, O.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati, O.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

VALVES, AIR
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.

VALVES (Air, Water, Steam)
Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago, Ill.
Galland-Henning Mfg. Co., 2750 So. 31st St., Milwaukee, Wis.
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.

VALVES (Adjustable Orifice)
North American Mfg. Co., 2910 E. 75th St., Cleveland, O.

VALVES (Blow-off and Cut-off)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.

VENTILATING SYSTEMS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
DeBothezat Ventilating Equip. Div., American Machine & Metals Co., East Moline, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland, O.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit, Mich.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York
Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, Ohio.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

VENTS (Core Box)
Wm. Demmler & Bros., Kewanee, Ill.,
C. M. Smillie & Co., 1100 Woodward Hgts, Blvd., Ferndale, Mich.

VIBRATORS
Adams Co., 700 Foster St., Dubuque, Iowa.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Cannon Vibrator Co., 1111 Power Ave., Cleveland, O.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago, Ill.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia, Pa.
S P O Incorporated, 7500 Grand Division Ave., Cleveland, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.

VIBRATORS (Core Bench)
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.

WAX (Core, Vent, Pattern)
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
United Compound Co., Inc., 328 South Park Ave., Buffalo, N. Y.

WEDGES (Foundry)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.
Haley Mfg. Co., Centerville, Indiana.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

WEIGHING DEVICES
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

WELDING GAS
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.

WELDING (Acetylene Generators)
Sight Feed Generator Co., Richmond, Ind.

WELDING APPARATUS (Electric Arc)
Sight Feed Generator Co., Richmond, Ind.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.

WELDING ROD
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Eutectic Welding Alloys Inc., 40 Worth St., New York City.
Stoody Co., 1139 W. Slauson Ave., Whittier, Calif.

WHEELBARROWS
Construction Machinery Corp., Waterloo, Iowa
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

WHEELBARROW WHEELS
French & Hecht, 523 East 3rd St., Davenport, Iowa.

WHEELS (Cut-off)
West Co. Inc., 1117 Shackamaxon St., Philadelphia, Pa.

WHEELS (Metal)
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Electric Wheel Co., Quincy, Ill.

WHEELS (Wire)
Osborn Mfg. Co. 5401 Hamilton Ave., Cleveland, O.

WIRE BRUSHES
Osborn Mfg. Co. 5401 Hamilton Ave., Cleveland, O.

WIRE CLOTH
Buffalo Wire Works Co., 425 Terrace, Buffalo, N. Y.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.

WOODWORKING MACHINERY
Delta Mfg. Co., Industrial division 620 E. Vienna Ave., Milwaukee, Wis.
Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Oliver Machinery Co., Grand Rapids, Mich.

X-RAY EQUIPMENT
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago, Ill.
Kelley-Koett Mfg. Co., 212 W. 4th St., Covington, Ky.
Magnaflux Corporation, 5910 Northwest Highway, Chicago, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

X-RAY FILMS
Picker X-Ray Corp., 300 Fourth Ave., New York City.

X-RAY INSPECTION
Kelley-Koett Mfg. Co., 212 W. 4th St., Covington, Ky.
Magnaflux Corporation, 5910 Northwest Highway, Chicago, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York, N. Y.

ZINC
American Smelting & Refining Co., 120 Broadway, New York

PUT THE JOB INTO

STRONG HANDS

WITH STEEL CONVERSION

CHIPPING CHISELS

BUILT UP TO A STANDARD —NOT DOWN TO A PRICE!

In every Steel Conversion tool, there is that important combining of highest quality basic raw materials—pyrometer controlled forging furnaces—scientific heat treating—and rockwell testing.

Each shank is ground to U. S. Navy standard—held to a tolerance of plus or minus .001 inch.

WE CAN FURNISH THE RIGHT CHIPPING TOOL FOR EVERY JOB

Special tools of your own design can be supplied—your drawing and specifications are all that is required.

FOR STANDARD STOCK SIZES—WRITE FOR BULLETIN NO. 100

STEEL CONVERSION & SUPPLY COMPANY

MILLS UTILITIES S FOUNDRIES

General Offices:

25 WILLOW AVENUE

CASTLE SHANNON, PITTSBURGH, PA.

3 H. P.

● The constant high speed and fast cutting action of MALL Grinders are incentives to better workmanship and greater output where operations include metal cleaning and finishing. In addition, tool life is lengthened, rejects reduced and the light weight working tools minimize fatigue.

These independently, electric-powered grinders are free from interference by other tools, can be wheeled anywhere in the shop and will operate either a straight or angle spindle. Available for Victory Production with caster base or overhead trolley mounting.

ARMY E NAVY

Full details upon request. **Buy War Bonds**

MALL TOOL COMPANY

7720 SOUTH CHICAGO AVE., CHICAGO 19, ILLINOIS

NEW Gasweld MOULD DRYING TORCH

For QUICKER, SAFER "SKIN" DRYING OF MOULDS

This unique new mould drying torch has many important advantages. Its light weight, only 3½ pounds, permits faster work than old fashioned, cumbersome types. Operates efficiently using natural or city gas with working pressures as low as 4 ounces. The torch tip (PH-80-7) throws a large bushy flame that heats and dries large areas. Ruggedly constructed, well-balanced and extremely easy to handle. Eliminates oil leak hazards frequently responsible for porous castings. Mail coupon for full particulars.

Wall Chemicals Division of

THE LIQUID CARBONIC CORPORATION

3110 S. Kedzie Ave., Chicago, Ill.

Manufacturers of Oxygen and Acetylene and the "Gasweld" line of Welding and Cutting Apparatus

Branches: Buffalo • Detroit • Cincinnati • Louisville Milwaukee • Rochester • Toledo

Wall Chemicals Division of The Liquid Carbonic Corporation
3110 S. Kedzie Ave., Chicago, Ill.

☐ Send data on Gasweld Mould Drying Torch. ☐ Send "Gasweld" Catalog.

*Name*_____

*Address*_____

*City*_____ *State*_____

at Birdsboro Foundry & Machine Co.

●

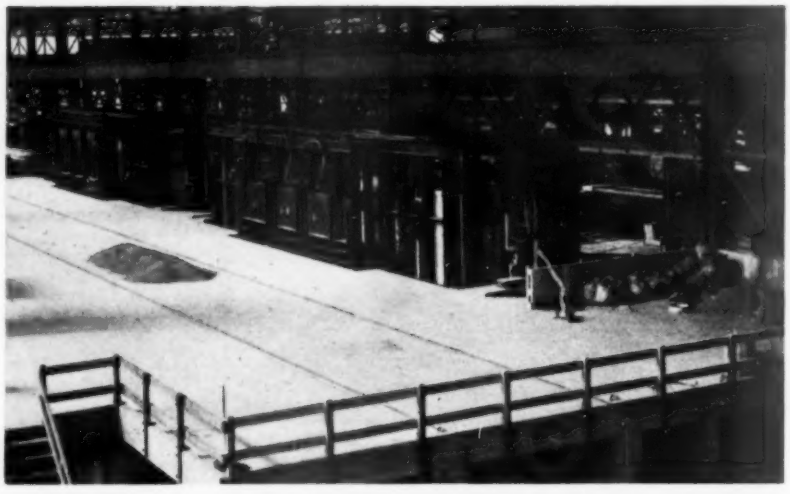
CONSULTANTS ENGINEERS & CONTRACTORS

specializing in

FURNACES OF ALL TYPES

particularly for

IRON, STEEL AND ALUMINUM PLANTS



Two 50-Ton Basic Open Hearth Furnaces

LOFTUS ENGINEERING *corporation*

OLIVER BLDG PITTSBURGH PA

CHAMPION EMERY WHEEL DRESSERS

A Type and Size for Every Wheel

Made of special material —processed and heat treated—runs in oil bearing. *Send for details and prices.*

WESTERN TOOL & MFG. CO., Springfield, Ohio

CORE WIRE

STRAIGHTENED AND CUT TO SIZE

Write for Descriptive Circular

PROGRESSIVE CORE WIRE CO.

1025 Bronson Court S. E. Cleveland 15, Ohio

Employee Identification Badges
Tool Checks—Time Checks

Plastic Cases for Work Cards

ST. LOUIS BUTTON COMPANY

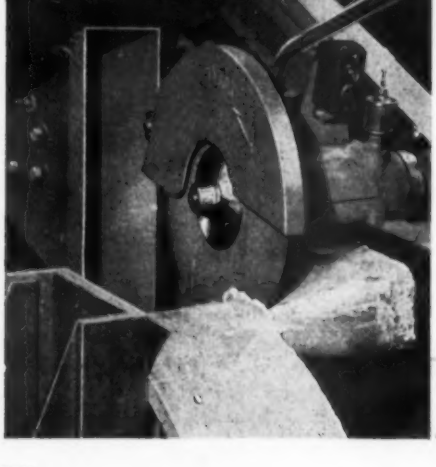
50 YEARS OF SERVICE

415 LUCAS AVE. ST. LOUIS (2), MO.

PRODUCERS CORE SAND CORPORATION

PITS AT MICHIGAN CITY, INDIANA AND SAWYER, MICHIGAN

MICHIGAN CITY, INDIANA



WEST CUT-OFF WHEELS

The only wheel developed especially for the cutting of gates and risers

THERE IS A WEST WHEEL FOR EVERY NONFERROUS, STEEL OR IRON CUTTING JOB

THE WEST COMPANY

1117 SHACKAMAXON ST., PHILADELPHIA, PA.

Classified Advertising

Help Wanted

CORE ROOM FOREMAN

Gray iron and steel foundry in the Middle West wants core room foreman capable of taking complete charge. Must be able to make up mixes for all kinds of gray iron and steel casting cores. Capacity: 250 ton Gray iron and 25 ton Steel. Address: Box 254, The FOUNDRY, Cleveland.

CORE ROOM FOREMAN

Experienced man for core room of jobbing malleable iron foundry, making light and medium castings. Must have knowledge of bench, roll-over and core blowing equipment. Excellent peace-time opportunity for the right man. Write, giving complete qualifications, age, and previous experience. Address: Box 180, The FOUNDRY, Cleveland.

REPRESENTATIVES WANTED

Well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items wishes to obtain additional representation by salesmen now calling on foundries regularly. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Light and medium gray iron foundry. Must be experienced in medium jobbing and production work. Competent on cupola practice and able to handle men. State experience, qualifications, age and expected salary to start. Plant located in Cleveland area. Good opportunity. Address: Box 245, The FOUNDRY, Cleveland.

FOUNDRY PRODUCTION CONTROL

Man wanted with experience to install and handle Production Control in a large Ferrous Foundry in the Chicago area. Must have knowledge of foundry production and various foundry methods involving production on molding machine and sandslinger. Must be able to schedule work and see that schedules are maintained. Write us giving experience in detail, training, and education, draft status and expected salary. Address: Box 259, The FOUNDRY, Cleveland.

ELECTRIC FURNACE OPERATOR OR FIRST HELPER

Electric Furnace operator or First Helper in large steel Foundry. Good salary and favorable prospects. Now in defense work, but large post-war business assured. First letter must state past experience in detail, age, draft status, education or training, and salary desired. All applications considered in strict confidence. Address: Box 258, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN

By a large Chicago Gray Iron jobbing production Foundry, handling light and medium castings, largely on squeezer and molding machines. State in your reply your age, experience fully, draft and family status, also salary expected. All applications confidential. Unusual opportunity for man who has been successful in obtaining maximum production. Address: Box 185, The FOUNDRY, Cleveland.

SALESMAN

With some metallurgical and practical cupola melting experience preferred, to sell gray iron foundry necessity for firm 50 years leader in its field. Salary basis; permanent position, not affected by post-war conditions. Give full information as to age, family status, experience, education and references in first letter. Address: Box 261, The FOUNDRY, Cleveland.

FOUNDRY ENGINEER

To look after the care and maintenance of machinery and equipment. Must be a practical man, thoroughly experienced in all important measures and precautions necessary to get the maximum life out of machinery and tools in a highly mechanized Foundry. To such this position offers a broad opportunity. In confidence, wire past experience fully, age, basic and technical education, draft status and starting salary. Address: Box 188, The FOUNDRY, Cleveland.

WANTED

Open hearth operators Brass and Aluminum. Middle West, state references in first letter. Permanent 100% War Work. Address: Box 209, The FOUNDRY, Cleveland.

Help Wanted

PERMANENT MOLDER FOREMAN

For Aluminum Alloy Foundry, located in New Orleans, La. Must understand permanent molds, take care of setup and be able to start and keep jobs running. Permanent position with a real opportunity for the future. Address: Box 266, The FOUNDRY, Cleveland.

CORE ROOM FOREMAN

For gray iron foundry located in Northeastern Ohio using production and semi-production medium size cores. Payment on the basis of salary and bonus. When writing, please give all qualifications, experiences, references, etc. Address: Box 230, The FOUNDRY, Cleveland.

WANTED

Melter to take complete charge of 15 ton open-hearth furnace, making carbon steel castings. Address: Box 268, The FOUNDRY, Cleveland.

CORE WASH SALESMEN

Must be in active contact with foundries and especially core rooms in Ohio and Western Pennsylvania; opportunity to build a successful future; address: Box 260, The FOUNDRY, Cleveland.

IRON FOUNDRY METALLURGIST

Wanted Iron Foundry Metallurgist for large jobbing foundry in Los Angeles. Must be thoroughly experienced in cupola operations. Write giving education, experience, salary desired, photograph if possible and other complete information. Address: Box 267, The FOUNDRY, Cleveland.

CLEANING ROOM FOREMAN

For steel foundry—Castings up to 1500 pounds. Subject to rigid inspection. Must have good record in handling all types of labor, to get out production. Philadelphia district. Address: Box 226, The FOUNDRY, Cleveland.

MACHINE DESIGNER

Experienced on the design of special foundry equipment for long established manufacturer. Machine tool experience preferred. Must be U. S. citizen and have certificate of availability. Give complete experience including salary required and references. This is a permanent position with emphasis on postwar development. Address: Box 262, The FOUNDRY, Cleveland.

METALLURGIST

Skilled in all phases of cupola operation. Permanent position requiring travel middlewest. State in your reply your age, experience fully, draft and family status, also salary expected. Applications considered in strict confidence. Address: Box 263, The FOUNDRY, Cleveland.

WANTED

Steel and gray iron molders
Union shop
N. & S. FOUNDRY COMPANY,
SEATTLE, WASH.

HELP WANTED

Young man, technical training preferred, to assist foundry foreman in medium small gray iron foundry. Chief requirement is ambition to qualify for foundry superintendent's position. Permanent position for the right man. Address Box 212. The FOUNDRY, Cleveland

MOLDERS AND MELTERS

For well-established production brass foundry in mild, sunny Colorado. Address Box 275, The FOUNDRY, Cleveland.

SUPERINTENDENT

Malleable iron foundry in East wants man with experience and ability enough to superintend all production operations. Daily melt of 30 tons. All replies will be held confidential. Give record of experience, salary wanted, and references in first letter. Address: Box 283, The FOUNDRY, Cleveland.

STEEL FOUNDRY FOREMAN

Familiar with modern methods and practices. Capable of rigging, gating and risering. Give experience. Address: Box 282, The FOUNDRY, Cleveland.

PATTERN SUPERINTENDENT

Experienced man to take complete charge of pattern shop of 15 to 20 in Large Malleable Iron Foundry, located in Michigan area. Address: Box 270, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

To take charge of modern iron foundry specializing in heavy casting work—40 to 50 tons a day capacity. Must be thoroughly familiar with dry sand work. Only experienced man need apply. Reply: Box 237, The FOUNDRY, Cleveland.

Help Wanted

ENGINEER WITH FOUNDRY—MACHINE TOOL EXPERIENCE

Post war opportunity; permanent position for energetic, progressive engineer with pleasing personality and faculty for leading men in getting work accomplished. Company with several plants located in western Pennsylvania is long established and progressive. Position will lead to plant production managerial work.
Write giving full details of current and past experience, salaries, education, age, marital status, etc. Address: Box 235, The FOUNDRY, Cleveland.

Positions Wanted

GRAY IRON FOUNDRY GENERAL FOREMAN

Thirty years' foundry experience of which has been general foreman for twenty years on jobbing machinery, castings and practical foundryman in every detail. New Jersey preferred. Best reference. Address: Box 222, The FOUNDRY, Cleveland.

FOUNDRY SUPERVISOR

Practical Grey Iron Foundryman. Well trained for high class supervisory, technical and executive position in a grey iron foundry organization. Twenty-five years' broad experience producing quality castings, light, medium and heavy. Machine tool engine, general jobbing and production. Well versed in cupola operation, metallurgy, foundry cost and incentive system. Able to train and direct subordinates. Middle age and out of draft. Address: Box 227, The FOUNDRY, Cleveland.

PLANT SUPERINTENDENT

Well versed in the production of ferrous and nonferrous castings desires a connection in the South or Southwest. Successful record with some of the larger producers. Responsibly employed at present but desires better health conditions for one of the members of family. For complete details address: Box 234, The FOUNDRY, Cleveland.

GENERAL MANAGER
MATURE, CAPABLE, AGGRESSIVE, DEPENDABLE

with a record that assures you that he can and will manage your business energetically and safely and develop its possibilities fully and profitably. Broad experience in foundry, machinery and allied lines. General management established medium-size business primary objective. Correspondence in confidence. Address: Box 247, The FOUNDRY, Cleveland.

MALLEABLE FOUNDRY SUPERINTENDENT

Twenty years' experience as foreman and superintendent in light, medium and heavy malleable production and jobbing castings. Practical and technical. Thorough understanding of melting and mixing, rigging, gating, sand control, estimating, cost and shrink conscious for high quality work. Age 46. Now available. Address: Box 273, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN

With 29 years' practical experience as a molder and foreman in light and medium gray iron foundry. Also practical experience in aluminum foundry. Forty-seven years old. Prefer Northeastern Ohio. Available around January 1. Address: Box 276, The FOUNDRY, Cleveland.

METALLURGIST—CHEMIST

Age 30, located in Washington, D. C. with excellent library facilities. Will engage in part time bibliography research and associated activities. Formerly with Bureau of Standards. Abundant previous specialization in such activities, many years professional experience. Small or large assignments. Address Box 272, The FOUNDRY, Cleveland.

MANAGER-SUPERINTENDENT

A practical, technically trained gray iron foundryman, graduate foundry chemist; with 27 years broad experience from molder to superintendent, producing quality castings in machine tool, high production, general jobbing. Well versed in sand, cupola, cores, working from blue prints etc. Would like to make connection with one large foundry in East or New England desiring high grade foundryman for results. Address: Box 279, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Employed. Desires position in Central or Southern New England. Vast experience on green or dry sand. Modern cupola practice and sand con- [illegible] Address: Box 202, The FOUNDRY, Cleveland.

Classified Advertising

Positions Wanted

STEEL FOUNDRY MANAGER OR SUPERINTENDENT

Ten years as chemist and metallurgist and fifteen years as manager and superintendent. Have just completed a large steel foundry and have it in production with less than 1% scrap. Can make good acid or basic electric steel and know converter and cupola operation. Thoroughly familiar with light and heavy machine molding and all departments of the foundry. Age 45 years. Address: Box 285, The FOUNDRY, Cleveland.

PERMANENT MOLD ENGINEER OR FOUNDRY SUPERINTENDENT

Aluminum and magnesium experience. Practical molder, inspector, estimator, designer, metallurgist and foundry manager. Desires position with established concern. Address: Box 280,

FOUNDRY MANAGER & METALLURGICAL ENGINEER GRADUATE—FIRST CLASS

Twenty-five years' experience in all phases of foundry operations in Steel, Gray Iron and Nonferrous Metals, desires change with firmly established concern where his executive ability can be fully used and remunerated. Age 46. Address: Box 251, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Fully experienced in nonferrous metals—light, medium and heavy castings. Rigging, gating, cost estimating, blue print reading and core room production. Neat appearing and aggressive. Age 42. Thorough experience as foundry superintendent. Experience including steam valve high pressure casting aluminum, brass bronze, nickel, copper, aluminum bronze, silicon bronze and high manganese bronze casting. Employed. Address: Box 286, The FOUNDRY, Cleveland.

METALLURGIST—MELTING SUPERINTENDENT

FIFTEEN YEARS' EXPERIENCE PRODUCING ACID ELECTRIC STEELS INCLUDING HIGH ALLOY STEELS. AGE 37, MARRIED, DRAFT EXEMPT AND AT PRESENT EMPLOYED. ADDRESS: BOX 287, The FOUNDRY, CLEVELAND.

FOUNDRY SUPERINTENDENT OR MANAGER

Available, practical and technical gray iron foundryman. Middle aged, good health and married. Thirty years' experience. Would like to contact job foundry with post war possibilities. Address: Box 249, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Thirty years' experience as foundry superintendent on heavy and light work. Good Rigger. Best of references furnished. Address: Box 271, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT OR FOREMAN

Grey iron or semi-steel, 22 years' experience as executive on general jobbing and machinery, medium and heavy. Practical foundryman in every detail. Address: Box 256, The FOUNDRY, Cleveland.

FOUNDRY MASTER MECHANIC

Twenty years of practical, mechanical, electrical and foundry construction experience in supervisory capacity. Forty-nine years of age. Address: Box 264, The FOUNDRY, Cleveland.

WANTED

Electric steel foundry manager or superintendent with ten years' experience on small and medium castings. Available November 1. Would consider foreign service. Address: Box 269, The FOUNDRY, Cleveland, Ohio.

FOUNDRY SUPERINTENDENT

Practical gray iron foundry man wide experience. Medium heavy high grade green and dry sand machinery castings. Twenty-two years as superintendent. Well versed in cupola operation and metallurgy. Invites correspondence from foundry needing a man of this experience. Address: Box 284, The FOUNDRY, Cleveland.

METALLURGIST

With experience on light, medium and heavy grey iron castings. Technical education and seven years' foundry experience. Capable of handling men. Some nonferrous experience. Address: Box 290, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Thirty-two years' experience. Twenty years' Foundry Superintendent, both ferrous and nonferrous metals. Green and dry sand. A No. 1 on metals. At present employed but capable of greater responsibilities. Suitable connection more important than large salary. Address: Box 289, The FOUNDRY, Cleveland.

Positions Wanted

PERMANENT MOLD DESIGNER

Desires part time job designing molds for aluminum castings; New York City and vicinity. Address: Box 288, 110 E. 42nd St., New York.

Wanted-To-Buy

WANTED

Second-hand Wheelabrator. Address: Box 281, The FOUNDRY, Cleveland.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

WANTED

"AA" size 62-52" cutting cylinder 4 Cylinder Gas Engine Sand Cutter.

SANITARY COMPANY OF AMERICA, LINFIELD, PA.

WANTED

ONE USED STATIONARY OR PORTABLE TYPE PYROMETER SUITABLE FOR BRASS AND ALUMINUM. MUST BE IN GOOD CONDITION. ADDRESS: BOX 277, THE FOUNDRY, CLEVELAND.

CASTINGS WANTED

A foundry preferably in the East to quote on supplying large quantities gray iron castings averaging ¾ lb. each at competitive prices. Castings are made from aluminum match plates. No core work. Address: Box 238, The FOUNDRY, Cleveland.

WANTED

Electric Melting Furnace 300-1000 pounds capacity, 3 phase 60 cycle, to be used for research purposes. Please state transformer capacity and voltage on supply lines. Address: Box 265, The FOUNDRY, Cleveland.

Foundries for Sale

FOUNDRY NON-FERROUS

Est. over 30 years; near Cleveland; furnace capacity 3 ton; metal flasks; well equipped; employ 50; same clientele for many years; sales over $500,000 year; large back-log; excellent profits; sell complete; for details.

THE APPLE COMPANY

BROKERS EST. 1905 CLEVELAND, OHIO

FOR SALE

Well equipped gray iron foundry in Ohio now doing war work. Address: Box 204, The FOUNDRY, Cleveland.

FOR SALE

Stove Foundry 50 molder size fully equipped, located in Central West. Address: Box 278, The FOUNDRY, Cleveland.

Foundry For Lease

WANTED TO LEASE

A foundry in Southeastern Pennsylvania for making small gray iron castings. Must be equipped with portable moulding machines, at least 8,000 sq. ft. foundry space and at the present time in operation. Address: Box 239, The FOUNDRY, Cleveland.

Opportunities

A Sales and Engineering Office is being opened in Cincinnati to deal in castings, forgings and patterns. Manufacturers desiring representation in this area should contact Box 274, The FOUNDRY, Cleveland.

Employment Service

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.

1010 Public Square Building Cleveland, Ohio

SALARIED POSITIONS

This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details.

R. W. BIXBY INC.

101 Delward Bldg. Buffalo, N. Y.

STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the act of congress of Aug. 24, 1912 and March 3, 1933, of THE FOUNDRY, published Monthly at Cleveland, O., for Oct. 1, 1943. State of Ohio, county of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared Geo. O. Hays, who, having been duly sworn according to law, deposes and says that he is the Business Manager of THE FOUNDRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal laws and regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Penton Publishing Co., Cleveland, Ohio. Editor, Frank G. Steinebach, Cleveland, Ohio. Managing Editor, None. Business Manager, Geo. O. Hays, Cleveland, Ohio. 2—That the owner is The Penton Publishing Company, Cleveland, Ohio. Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: Edwin C. Barringer, Washingtn, D. C.; Samuel E. Bool, Cleveland, Ohio; Richard M. Bourne, Cleveland, Ohio; Dorothy L. Cole, Long Island, N. Y.; County National Bank of Santa Barbara, Santa Barbara, Calif.; J. R. Dawley, Cleveland, Ohio; Ernest C. Dempsey, Richard Inglis & Central National Bank of Cleveland as Trustees under agreement with John A. Penton dated Feb. 16, 1924, Cleveland, Onio; The Fanner Manufacturing Co., Cleveland, Ohio; George O. Hays, Cleveland, Ohio; Russell C. Jaenke, Cleveland, Ohio; S. H. Jasper, Pittsburgh, Pa.; A. L. Klingeman, Cleveland, Ohio; E. C. Kreutzberg, Washington, D. C.; Parness & Co., Cleveland, Ohio; J. D. Pease, Mount Dora, Florida; L. E. Penton, Los Angeles, Calif.; E. L. Shaner, Cleveland, Ohio; Charles J. Stark, Cleveland, Ohio; Penelope M. Stark, Cleveland, Ohio; E. L. Werner, Cleveland, Ohio; Grace Whelan, Santa Barbara, Calif. 3—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: John Hancock Mutual Life Insurance Co., Boston, Mass. 4—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. Geo. O. Hays. Sworn to and subscribed before me this 23rd day of September, 1943. (Seal) F. S. Fraser. (My commission expires March 10, 1944.)

Classified Advertising

For Sale

SPECIAL DEFENSE BARGAINS

Cast Iron and Steel Plate Mill-Dust & Shavings Exhausters 50 in stock. **Cupola and Furnace** Blowers for Coke, Oil or Gas Combustion.

Brass Foundry Furnaces: No. 2—42"—class A Schwartz, with or without blower.

1—Compressor 7½ x 6 Chicago Pneumatic.

1—Compressor 9 x 8 Ingersoll-Rand.

Two Monarch Rotating Barrel type furnaces each 500 lbs. per heat capacity, one newly carborundum lined.

1—Hausfeld No. 150 crucible size tilting furnace, oil or gas fuel.

1—Hausfeld 400 lbs. (non-crucible) per heat capacity, complete—newly lined and with Electric Blower set attached, for 3/60/220 A.C.

1—Booth Electric Furnace with accessories 725 lbs. cap., with new unused extra lining.

Can furnish stationary furnaces on short notice for crucibles No. 60 to No. 125 with swing top covers.

Molding Machines:

1—Type F International 26" x 36" platen air jolt roll over eight inch draw stationary molding machine.

1—Battenfeld stationary jolt—squeeze—lift 17" x 22" table.

1—Battenfeld stationary jolt—squeeze 17" x 22" table.

1—Tabor plain jolt table No. B-8—28" x 40".

1—Tabor plain jolt table No. B-6—30" x 36".

1—Tabor plain jolt table No. B-18—54" x 96".

Tumbling Mills:

1—Sly 48" x 60" round 1" thick steel shell.

1—Dings No. 2 Magnetic Separator with AC-DC Motor Generator Set.

1—Burton portable core oven cabinet type.

1—Spencer blower 3600 CFM @ 1½ lbs.—40 h.p. motor.

1—Spencer blower 2250 CFM @ 1½ lbs.—25 h.p. motor.

1—Core sand mixer 3 cu. ft. capacity.

1—Royer Sand Conditioning machine No. B2.

CLIFTON MACHINERY CO.
1023 W. 6TH, CINCINNATI 3, OHIO

SAND BLAST BARREL

48" Dia., 42" deep, 16-18 cu. ft. capacity. Manufactured by W. W. Sly. Rebuilt and in first class condition. Make offer to:

JONSON FOUNDRY & MACHINE CO.
1819 BROADWAY NEW YORK 23, N. Y.

WELDING, CUTTING EQUIPMENT

Torches, Regulators and Gauges,
Aircraft welding outfits,
Lead welding outfits and torches,
Soldering outfits, Acetylene Generators,
Supplies, Electric Arc Welders, Electrodes.

Superior Oxy-Acetylene Co.
Hamilton -:- Ohio

FOR SALE

One tractor type sandslinger. 11'-8" high overall. 16" head with hinged cover. Used but completely overhauled and in good working condition. Also, one Sturtevant No. 9 pressure blower with 50 HP—220 Volt—3 phase Wagner motor. Address: **DIAMOND IRON WORKS INC., 1709 NO. 2nd STREET, MINNEAPOLIS 11, MINNESOTA.**

COMPRESSORS AND BLOWERS

2100 cfm @ 12 oz. Gen. Elec. Centrifugal compressor with 10 HP 2-60-3450 RPM motor.

2—1200 cfm @ 11 oz. Buffalo Pressure Blowers, 9½" intake 7" x 7¼" outlet, with 7½ HP 3-60-1800 RPM motors.

SAND VIBRATOR

7 to 8 ton per hours, Jeffery-Traylor with vibrator M.G. set. Write, wire or phone.

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE., CLEVELAND 14, OHIO

For Sale

TANKS

from Tank Cars—Large quantity
8,000 gallon—10,000 gallon
Built for 60 lbs. Hydrostatic and
25 lbs. Air Tests.

CLEANED — TESTED — PAINTED

Special Notice

What would PORTABLE storage of your Liquids save you? Ask our proposition on WHOLE CARS!

Also TANKS, Commercial

Vertical and Horizontal. From 2879 to 12,500 gals. and even much larger.

IRON & STEEL PRODUCTS, INC.

38 years' experience

13444 S. Brainard Ave. Chicago 33, Illinois

"ANYTHING containing IRON or STEEL"

FOR SALE

INTERNATIONAL Type AN Power clamp, power turnover power draw machine. Size 30" x 16" draw with 1500 lbs. turnover capacity. Used hardly at all as our line of work changed. Address: **THE E. H. BARDES RANGE AND FOUNDRY CO., 2619 COLERAIN AVE., CINCINNATI 14, OHIO.**

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.

ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEEL TANKS

9—5000 gal., 11,500 and 18,000 gal. cap.
17—1000 bbl., 4000 bbl. and 10,000 bbl. cap.

TANKS BOUGHT AND SOLD

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

REBUILT

BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY

406 N. Peoria St. Chicago, Ill.

FOR SALE

One No. 4 Sly Sand Blast Mill with gearhead motor drive and one No. 22 Sly Unit Dust Filter with fan and motor complete excellent condition. Address: Box 255, The FOUNDRY, Cleveland.

FOR SALE

Portable Moline Molder in good shape $45.00. Write Mid-West Housing, P. O. Box 628, Janesville, Wis.

FOR SALE

One J S 5—13" International Jolt Squeeze Molding Machine. One 20" American Turret Lathe. Address: Krause Manufacturing Co., Hutchinson, Kansas.

FOR SALE

1—Used Single phase Electric Steel Furnace complete with transformers, 12,000 volt primary. Automatic Electrode Control etc. Purchased new May 1942. Has been producing 7 tons daily. Can make shipment within 3 days. Price F.O.B. shipping point $5500. Address: Box 161, The FOUNDRY, Cleveland.

For Sale

REBUILT EQUIPMENT IN STOCK

IMMEDIATE SHIPMENT

MISCELLANEOUS ITEMS

(1)—No. 60 Fisher stationary crucible Furnace, oil fired, new lining.

(1)—3-ton geared crane type Ladle.

(2)—1¾" Power Sprue Cutters.

(3)—Branford Shakeout Vibrators.

(1)—275-J Osborn Jolt Squeezer.

(1)—10" Tabor Post Type Squeezer.

(2)—1½-yd. Hayward 230-VDC. Elec. Buckets.

(1)—1½ yd. single Line Brosius Bucket.

ELECTRIC MONORAIL HOISTS

(1)—1½-ton Shepard, 1-motor, 220/3-60-cy.

(2)—1-ton Euclid, 1-motor, 110/230-VDC.

(1)—1 ton, 2 motor Cleveland Tramrail, 230-VDC. cage operated.

(1)—5-ton, 2 motor, Shepard, 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

	Tons	Make	Span	Current
(1)	1	Maris	35'7"	230-VDC
(1)	5	P & H	50'0"	A.C. or D.C.
(1)	10	Whiting	32'0"	220/3/60-cy.
(1)	10	American	54'1½"	230-VDC
(1)	10	Morgan	58'2"	230-VDC
(1)	75/25	Morgan	59'0"	230-VDC

Our large modern plant is equipped to rebuild any of these cranes to suit your requirements. Send us your motor inquiries, we have a large stock of Crane, Mill & General Purpose Motors.

T. B. MacCABE CO.
4304 Clarissa St. PHILADELPHIA 40, PA.

PRICED RIGHT FOR QUICK SALE

COMPLETE MELTING DEPT. for STEEL

FOUNDRY TRIPLEX PROCESS

2-ton side-blow Whiting Steel Converter complete with 5 HP Motor and accessories, including Roots Blower—75 HP Motor, Etc.

No. 6 Whiting Cupola, 63 ft. high, 66" dia. equipped with McWane Tuyeres, Whiting Skip Chargers 18.75 cu. ft. bucket cap., with steel work platform, etc.—including Type "P" American Cupola Blower and 40 HP Motor for same.

Pittsburgh "Lectromelt" 1-ton cap. cold melt, Model "R" Furnace with 1000 KVA Transformer, 13,800V primary and 105/215 V secondary with 250,000 KVA oil circuit breaker with all sub-station controls, meters, etc.

Holcroft CAR TYPE Annealing Furnace, gas fired, arranged for 20 lbs. natural gas complete with Controllers, with 2—9 x 18 (net size) cars, arranged for 6 ft. high loading-doors on both ends of furnace, arranged with 5 HP Car Puller.

This equipment purchased NEW less than one year ago—still intact as last operated and will sell individually—for immediate shipment.

WIRE—PHONE—WRITE

SCULLY MACHINERY & EQUIPMENT CORP.

PHONE PROSPECT 8770

2031 WEST 74th ST.—CHICAGO

Absolute & Unrestricted

PUBLIC **AUCTION** PUBLIC

WEDNESDAY, NOVEMBER 17—11:00 A. M.

THE ENTIRE PLANT OF THE

HANNIBAL CAR WHEEL & FOUNDRY CO.

ON THE PREMISES

HANNIBAL, MISSOURI

Consisting of

CAR WHEELS

Over 300 new Car Wheels 650, 700 and 750 pound wheels; Over 3750 Car Wheels, Used, weighing 650, 700 and 750 pounds each.

PATTERNS

Patterns and Chillers for the manufacture of 650, 700, 750 and 850 pound car wheels.

INVENTORY & SUPPLIES

Large quantity of pig iron, Purite, Core Compound, Mineral Facing, Sea Coal, Oils of all kinds, Bar Steel, Ferromanganese, Silicon Briquettes, Ferrochrome, Fire Brick, Clay, Sand, Steel, Copper Wire, Pipe, Large Quantity of cast iron plates, Steel Plates, Paints, Enamels, over 1000 tons of scrap iron and steel.

ANNEALING PITS

16 annealing pits complete with covers.

MACHINE SHOP

Bullard 72" Boring Mill, 2 heads, 2 set jaws, electrical equipment; American Radial 3 Ft. Drill with motor, Garvin No. 5 Milling Machine, Powell Planer 27" x 27" x 8'; Porter 24" x 10' Lathe, New Haven 10" slotter; Prantiss 14" x 6' Lathe, Sellers 100 Ton Hydraulic Wheel Press; Bement 42" Wheel Boring Mill; Handley & Wittemore 6" Shears, National No. 7368 Bolt Machine, Putman 30" x 8' Lathe, Gardner Air Compressor 10 x 10 and motor; Treat Air Compressor and motor.

CUPOLA EQUIPMENT

Cupola 84" with Blower and 50 H.P. Motor; Foxboro Air Flow meter, complete; Elliptical Reservoir Ladle, 16,000 Pound Capacity and motor; Gear Reducers; Skip Cars; Hollister & Whitney Gear Reducers Size 4 AM; with drum and automatic switch board; Howe 100 Ton Track Scale; American 2,000 Pound Scales, Charging Cars; Coke Cars; Fairbanks 9,000 Pound Capacity Scale; Cranes, Galion Coke Unloader Complete; Kron Scales 10,000 Pound Capacity.

MISCELLANEOUS

Shop Cranes, Core Ovens, Annealing Ovens, Mixing Machines; Core Room Equipment; Wheel Shop Equipment; Fuel Pumps, Wheel Cleaning Equipment, Drop Forge Shop, Bull Ladles; Fire Fighting Equipment; Wood working Machinery; Pattern Shop; Generators, Pyrometers, etc.

EQUIPMENT

Motors; Blowers; Chain Hoists; Air Hoists; Air Chippers; Air Hammers; Small Tools; Chain Slings; Mixers; Cooler Fans; Conveyors; Scales; Charging Cars; Anvils; Portable Grinders; Portable Electric Tools; Air Hose; Emery Wheels; Repair Parts; Factory Trucks; Shop Trucks; Yard Trucks; Tanks; Office Equipment and numerous other items.

REAL ESTATE

Foundry and Machine Shop Buildings ready for immediate use. Foundry Building Size 90' x 100' and 125' x 250', in excellent condition. Machine Shop Building one story and basement, concrete building, size 62' x 85'. Lot size 150' x 680'. Railroad Burlington Switch for 8 cars.

ALL TO BE SOLD WITHOUT LIMIT OR RESERVE

Write for Descriptive Circular To

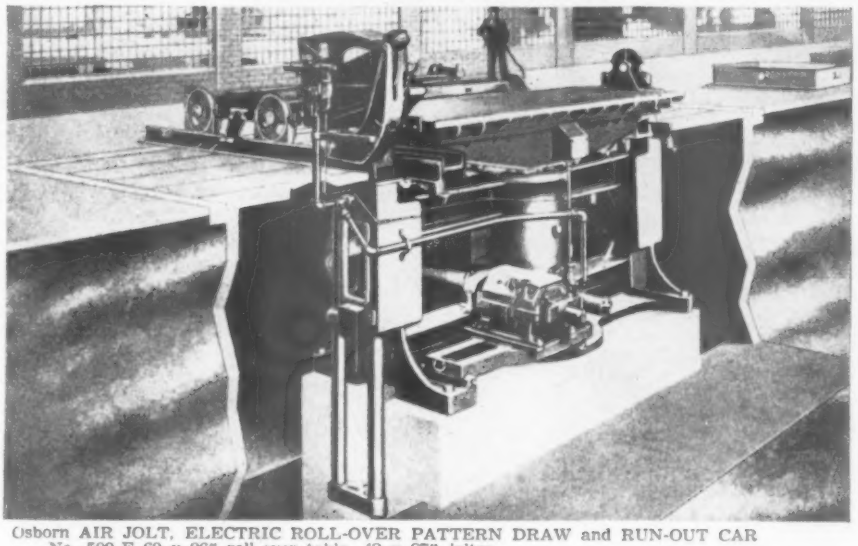
HARRIS AUCTION & SALES CO.

COLEMAN HARRIS—*Auctioneer* **813 MAIN ST., CINCINNATI, OHIO**

SCULLY Reconditioned Foundry Equipment

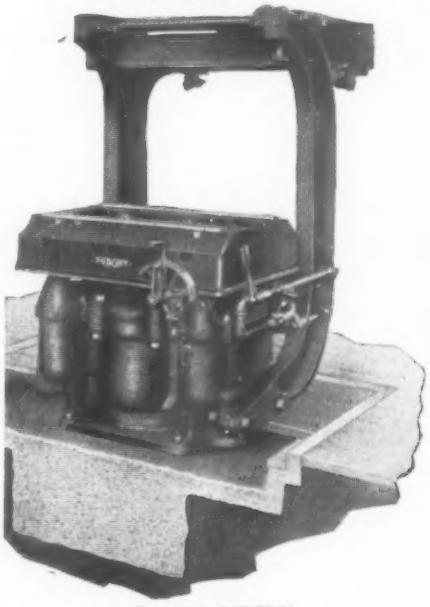
★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN, NEW MACHINE SHOP

OSBORN MOLDING MACHINE



Osborn AIR JOLT, ELECTRIC ROLL-OVER PATTERN DRAW and RUN-OUT CAR
No. 509-E 60 x 96″ roll-over table, 42 x 87″ jolter.
No. 513-E 36 x 124″ roll-over table, 36 x 112″ jolter.

OSBORN JOLT SQUEEZE & POWER STRIP



No. 703 OSBORN
(Similar to above excepting with roll-off)

No. 703-6 Osborn jolt squeeze and strip, 21 x 28″ table, stationary. Length of opening in lifting frame 34″, 6″ pattern draw, 8″ cyl. dia. 1000 lbs. jolting cap. @ 80 lbs. press. Distance from lifting frame to squeeze head 24¼″, flask length 44½″ with roll-off conveyor.

No. 703-5 Osborn, same as above, excepting 17 x 35″ table.

Pangborn 6 ft. dia. TYPE EH-1 CABINET TABLE INSTALLATION, 5 ft. high partition, Abrasive Handling and Reclamation System, Belt and Bucket Type Elevator, Sandblast Pressure Tank.

MOLDING MACHINES

No. 330 Arcade portable jolt roll-over squeeze, 10″ draw, distance between uprights 44″.

Osborn No. 322 jolt roll-over and squeeze (pit type) flask cap. max. length 36″ width 26″, pattern draw 9″, jolt cyl. dia. 7″, 750 lb. jolting cap. @ 80 lb. press., 44″ between uprights.

JOLT SQUEEZE STRIPPERS

No. 142 Milwaukee, stationary, 1200-lb. cap. @ 80 lbs., 6″ draw, table 19 x 35″—open end type.

No. 113 Milwaukee, open end type, portable, 500-lbs. cap. @ 80 lbs., 6″ draw, 16 x 35″ table.

Osborn No. 82 STRIPPING PLATE JOLT SQUEEZER, 46″ between rods, 10″ draw, 1200 lbs. jolting cap., 1000 lbs. stripping cap. 24 x 36″ table, pin lifts 12″ part one way, 36″ the other.

Nicholls Type "D" stationary heavy duty JOLT SQUEEZE & PATTERN DRAW, squeeze piston 14″ jolt piston 6″, draw 2-6″—distance between strain rods 40″ take approx. 15 x 24″ flask.

JOLT SQUEEZERS

No. 76 Arcade portable straddle type with swing-head, 17 x 20″ table—10″ dia. cyl.

No. "0" U. S. stationary, swing-head, 9″ squeeze cyl. 15 x 21″ table.

Nicholls stationary Type "B" 10-32, swing-head, 22 x 24″ table.

Nicholls 10-F stationary with swing-head, 15 x 16″ table, 10″ dia. squeeze cyl., 4″ jolt cyl.

PLAIN AIR SQUEEZERS

Tabor stationary 36″ between rods, 18 x 26″ table, 13″ dia. cyl.

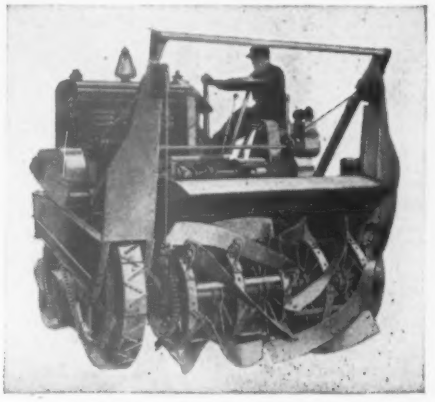
Davenport 33″ between rods, port. straddle type, 10″ cyl., 14 x 20″ table.

Arcade, portable 50″ between rods, 13″ dia. cyl. 20 x 28″ table.

AMERICAN SANDCUTTERS

Cleveland-American (similar to Model "K") 84″ spiral cutting cyl., 36″ dia., 92″ between tractor wheels, 5″ face—equipped with Cleveland 3-phase 60 cycle 220V AC Motors, Cable and Take-Up Reel.

Cleveland-American Model "B" 55″ spiral cutting cyl., 24″ dia.—60″ between tractor wheels, 3-motors, 3/60/220V AC Motors with Reel and Cable.



American Fdry. Model "K" heavy duty type, size 72, equipped with Buda Type "WTU" 20 HP Gas Engine. 72″ between tractor wheels, 6″ face, having 60″ cutting cyl.

Model "AA" size 62, 66″ between tractor wheels, 4″ face—O/A width 85″. Length 96″ and Height 80″—equipped with 4 cyl. Waukesha Gas Engine, 52″ cutting cyl.

NO. 8 DEMMLER CORE BLOWING MACHINES

OVERHEAD ELECTRIC TRAVELING CRANES

35-ton approx. 31'10″ span Power House Type, 4-motors, 550V DC Motors, with Aux., Chain on Main Hoist, Cable on Aux.

10-ton approx. 30'7″ span, 3-motor type, Northern Electrical 115V DC Motors, Hoist 15 HP 750 RPM, Rack 3 HP 1200 RPM, Bridge 7½ HP 950 RPM, EC&M Controllers, cage oper., 24″ double "I" Beams, cast iron truck ends, chain lift (trolley drum can be regrooved for cable, if necessary).

2-ton Johnson & Jennings approx. 20 ft. span, 3-motor type, 220 V DC, 2—12″ girders, trolley runs on lower flange of girder channels, cab hung from top of bridge channels.

BUCKET HANDLING CRANE 4-motor type, equipped with WHITING Trolley, 230V DC Motors—31'10″ span—cage operated.

5000 lb. 2-motor 220V DC P&H Special Cupola Charging CRANE equipped with swivel trucks (steel) for operating on lower flange of 15″ I-Beam—approx. 25′ vertical lift.

ELECTRIC HOISTS

1-ton P&H with MOTORIZED TROLLEY, 220V DC Motors, 20 ft. lift, speed 20 FPM.

3-Ton Link-Belt single point suspension with Top Hook (or can add Trolley if required). Floor operated, mechanical lowering brake, 18′ lift, speed 18 FPM, equipped with 115 volts, D.C. Motor, or can rewind for 220 V DC service.

5-ton Shepard Form 1 Class B-6 equipped with 6 HP 220V DC motor, floor control, 15 ft. lift, speed 15 FPM.

4—Detroit 1000 lb. Geared Air Hoists, with Top Hook.

SCULLY MACHINERY & EQUIPMENT CORP.

(Formerly – Foundry Division of Scully-Jones & Co.)

2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO 36, ILLINOIS

ADVERTISING INDEX

Ace Foundry Materials Co. 238
Acme Pattern & Tool Co., Inc. 167
Adams Co., The 60, 61
Air Reduction 86
Air-Way Pump & Equipment Co. 238
Ajax Metal Co. 185
Alloy Metal Abrasive Co. 223
Aluminum Refiners Div. of Bohn Aluminum & Brass Corp. 65
Aluminum Research Institute 17
American Air Filter Co., Inc. 81
American Bridge Co. 225
American-British Chemical Supplies, Inc. 229
American Crucible Co. 207
American Engineering Co. 85
American Foundry Equipment Co. 142, 143, 208
American Gum Products Co. 224
American Monorail Co., The 149
American Optical Co. 37
American Smelting & Refining Co., Federated Metals Division 99
Automatic Transportation Co. 21

Bartlett, C. O., & Snow Co. 49
Bay State Abrasive Products Co. 90
Beardsley & Piper Co., The 42, 43
Bellevue Industrial Furnace Co. 218
Berkshire Mfg. Co. 234
Bethlehem Steel Co. 1
Blaw-Knox Div. of Blaw-Knox Co. 194
Blodgett, G. S., Co., Inc., The 227
Blystone Div. Standard Sand & Machine Co. 221
Bohn Aluminum & Brass Corp. 65, 91
Brooke, E. & G., Iron Co., The 235
Buckeye Products Co., The 209
Buehler, Adolph I. 64
Buell Engineering Co., Inc. 133

Campbell-Hausfeld Co., The 168
Canadian Radium & Uranium Corp. 192
Cannon Vibrator Co. 234
Capewell Mfg. Co., The 184
Carborundum Co., The 57
Carl-Mayer Corp., The 20
Carman, Edwin S., Inc. 218
Certified Core Oil & Mfg. Co. 153
Champion Foundry & Machine Co. 8, 9
Chase Foundry & Manufacturing Co. 174
Chicago Manufacturing & Distributing Co. 203
Chicago Rawhide Mfg. Co. 222
Chicago Tramrail Co. 172
Chicago Wheel & Mfg. Co. 171
City Pattern Foundry & Machine Co. 46
Clearfield Machine Co. 16
Cleveland Chaplet & Mfg. Co. 220
Cleveland Electro Metals Co., The 205
Cleveland Flux Co., The 14
Cleveland Pneumatic Tool Co., The 100
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 67
Columbia Steel Co. 225
Combined Supply & Equipment Co., Inc. 218
Construction Machinery Co. 234
Corn Products Sales Co. 196
Cortland Grinding Wheels Corp. 176
Crucible Manufacturers Association 150
Cunningham, M. E., Co. 224

Davenport Machine & Foundry Co. 15
Dayton Oil Co., The 137
Dayton Pneumatic Tool Co. 226
DeBothezat Division of American Machine & Metals, Inc. 235
Delta Mfg. Co., The 190
Delta Oil Products Co. 12
Demmler, Wm., & Bros. 200, 236
Dempsey Industrial Furnace Corp. 195
Desmond-Stephan Mfg. Co. 238
Despatch Oven Co. 29
Detroit Electric Furnace Division Kuhlman Electric Co. 181
DeWalt Products Corp. 75
Diamond Clamp & Flask Co. 44
Dietert, Harry W., Co. 214
Dillon, W. C., & Co., Inc. 225
DoAll Co., The 95
Dougherty Lumber Co. 228

Eastern Clay Products, Inc. 41
Electric Furnace Co. 80
Electric Wheel Co. 205
Electro Metallurgical Co. 59
Electro Refractories and Alloys Corp. 94
Empire Varnish Co., Waterlox Division 213
Eutectic Welding Alloys, Inc. 187

Fanner Manufacturing Co., The 56
Federal Foundry Supply Co., The 2, 155, 211
Fisher Furnace Co. 62
Foundry Equipment Co., The 78, 79
Foundry Rubber Compounds Corp. 83
Foundry Services, Inc. 204
Fox Grinders, Inc. 229
Freeman Supply Co., The 104
Fremont Flask Co., The 50
French & Hecht, Inc. 230
Fuller Co. 173

General Blower Co. 237
General Electric X-Ray Corp. 10, 11
Giele, Walter, Co. 230
Globe Iron Co. 216
Globe Steel Abrasive Co. 219
Great Lakes Foundry Sand Co. 33, 34, 35, 36
Great Western Mfg. Co. 225
Grimes Molding Machine Co. 227

Haley Mfg. Co. 238
Hammond Machinery Builders, Inc. 217
Hanna Furnace Corp., The 26
Hauck Manufacturing Co. 234
Haws Refractories Co. 228
Haynes Foundry Equipment Co. 186
Hercules Powder Co., Inc. 141
Herman Pneumatic Machine Co. 52, 53
Hines Flask Co. 96
Hydro-Arc Furnace Corporation 97
Hydro-Blast Corp. 30, 31

Illinois Testing Laboratories, Inc. 204
Imperial Belting Co. 180
Industrial Equipment Co. 232
Industrial Gloves Co. 238
International Molding Machine Co. 159
International Nickel Co., Inc., The 131
International Paper Co. 227
Ironton Fire Brick Co., The 88

Jackson Iron & Steel Co., The 220
Jeffrey Mfg. Co., The 212
Johns-Manville 182
Johnson Corp., The 236

Kelley-Koett Mfg. Co., The 74
Kindt-Collins Co. 82

Lanly Co., The 191
Lee-Wood, Inc. 229
Lindberg Engineering Co. 19
Link-Belt Co. ..... Back Cover
Liquid Carbonic Corp., The 239
Loftus Engineering Corp. 240

McCormick, J. S., Co. 89
McLain's System, Inc. 226

Macklin Co. 13
Maehler, Paul, Co., The 101
Magnaflux Corp. 48
Mahon, R. C., Co., The 63
Mall Tool Co. 239
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc. 215
Marathon Chemical Company Div. of Marathon Paper Mills Co. 38
Marshall, L. H., Co. 217
Master Electric Co. 93
Master Tool Co. 156
Mathews Conveyer Co. 145
Mathieson Alkali Works (Inc.) Inside Front Cover
Michigan Smelting & Refining Div. of Bohn Aluminum & Brass Corp. 91
Milwaukee Chaplet & Mfg. Co. 193
Milwaukee Foundry Equipment Co. 39
Mine Safety Appliances Co. 197
Modern Equipment Co. ..... Front Cover, 248
Molybdenum Corp. of America 139
Monarch Engineering & Mfg. Co. 231
Murphy, James A., & Co. 221

National Engineering Co. 24, 25
National Steel Corp. 26
Neff & Fry Co., The 217
New Haven Vibrator Co. 188
Niagara Falls Smelting & Refining Corp. 231
Nicholls, Wm. H., Co., Inc. 66
Norton Co. 28

Ohio Ferro-Alloys Corp. 87
Oliver Machinery Co. 233
Osborn Manufacturing Co., The 102, 103
Ottawa Silica Co. 76

Pangborn Corporation 6, 7, 164, 237
Parsons Engineering Corp. 247
Penn Iron Works 235
Pennsylvania Foundry Supply & Sand Co. 237
Picker X-Ray Corp. 69, 70, 71, 72
Pioneer Mfg. Co. 209
Pittsburgh Crushed Steel Co. 231
Pittsburgh Lectromelt Furnace Corp. 178
Plaster Process Castings Co. 222
Pollard Oil Products Co. 232
Producers Core Sand Corp. 240
Progressive Core Wire Co. 240
Pyrometer Instrument Co., The 220

Radium Chemical Co., Inc. 223
Ransohoff, N., Inc. 51
Reading Chain & Block Corp. 207
Republic Steel Corp. 77
Riehle Testing Machines—Div. of American Machine & Metals, Inc. 198
Robeson Process Co. 224
Ross, J. O., Engineering Corp. 163
Royer Foundry & Machine Co. 23
Ruemelin Mfg. Co. 206

Safety Grinding Wheel and Machine Co., The 18
St. Louis Button Co. 240
Schneible, Claude B., Co. 73
Schramm, Inc. 165
Schundler, F. E., & Co., Inc. 199
Scientific Cast Products Corp., The 232
Scully Machinery & Equipment Corp. 216, 245
Sight Feed Generator Co., The 219
Silverstein & Pinsof, Inc. 169
Simonds Worden White Co. 183
Simplicity Engineering Co. 54
Sly, W. W., Mfg. Co., The 161
Smillie, C. M., & Co. 228
Smith, Werner G., Co., The 4, 5
Smooth-On Manufacturing Co. 215
SPO, Inc. 55
Standard Conveyor Co. 166
Standard Horse Nail Corp. 170
Staynew Filter Corp. 68
Steel Conversion & Supply Co. 239
Steel Shot & Grit Co. 231
Sterling Grinding Wheel Division of the Cleveland Quarries Co. 147
Sterling Wheelbarrow Co. 47
Stevens, Frederic B., Inc. ..... Inside Back Cover
Stoody Co. 233
Strand, N. A., and Co. 208
Stroman Furnace & Engineering Co. 27
Sturtevant, B. F., Co. 22
Sullivan Machinery Co. 58
Swindell-Dressler Corp. 84

Tabor Manufacturing Co., The 45
Tamms Silica Co. 206
Tannewitz Works, The 179
Thomas & Proetz Lumber Co. 224
Titanium Alloy Mfg. Co. 92

Union Carbide & Carbon Corp. 59
United Compound Co. 233
United States Electrical Tool Co., The 219
United States Graphite Co. 202
U. S. Steel Corporation and Subsidiaries 225
U. S. Steel Export Co. 225

Vonnegut Moulder Corp. 175
Vulcan Corp. 201

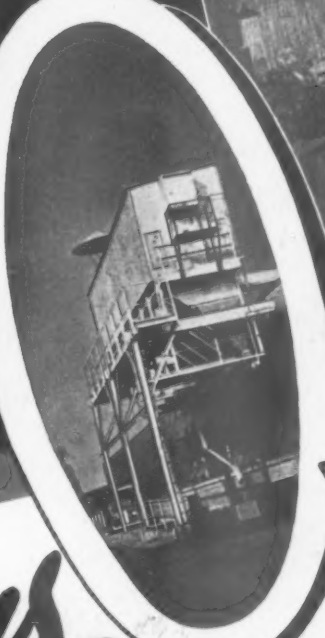
Wadsworth Core Machine and Equipment Co., The 215
Wall Chemicals Division of The Liquid Carbonic Corp. 239
Wellman Engineering Co., The 226
West Co., The 240
Western Tool & Mfg. Co., The 230, 240
Whiting Corp. 40
Wickland, A. A., & Co. 222
Woodward Iron Co. 135
Wrigley, Wm., Jr., Co. 189

Table of Contents, Page 3

Refer to alphabetical list of products in "Where-to-Buy" pages, beginning on Page 210

Classified Advertisers, Pages 241, 242, 243, 244, 245

DUST
THE BREEDER OF ABSENTEEISM



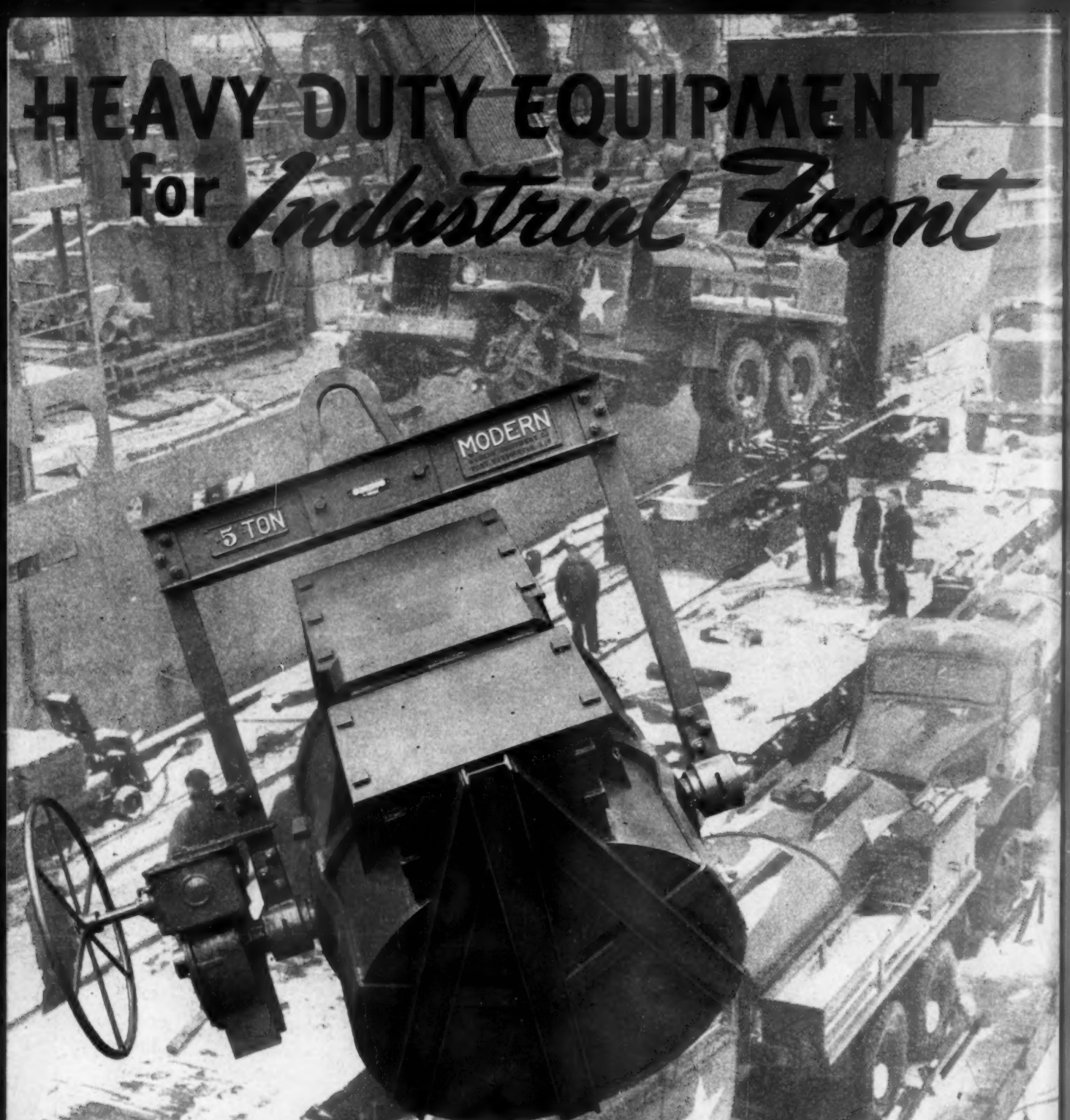
Parsons OVAL BAG
DUST ARRESTORS
CHANGE the PICTURE

Statistics prove that back of most absenteeism in plants is sickness and back of most of the sickness is factory dust and dirt. • Proper dust control and that means Parsons Oval Bag dust arrestors, will instantly cure most of the present day absenteeism and along with that increase your production beyond the present peak. Parsons Oval Bag dust arrestors, modern in every respect and equipped with many exclusive features afford not only employee protection but protection for plant equipment and buildings. • For over a quarter of a century Parsons Engineering Corporation has been engineering and installing dust control systems for some of the largest plants in the world. • Why not call in a Parsons engineer to check into your dust problem, no obligation whatever. Write and we will be glad to send you a copy of our dust control bulletin "Mastery of the Air"... it's free.

PARSONS ENGINEERING CORP.

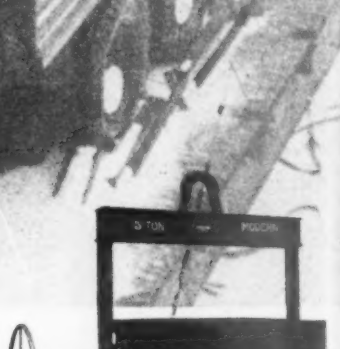
2545 EAST 79th STREET • CLEVELAND, OHIO

HEAVY DUTY EQUIPMENT for *Industrial Front*



Just as heavy-duty equipment is required for the fighting fronts, so, special heavy-duty equipment is required on the industrial front.

MODERN Engineers regularly work with heavy ladle users to design special heavy duty constructions like the above. A heavily reinforced ladle designed especially for severe round-the-clock operation, where delays just can't be tolerated.

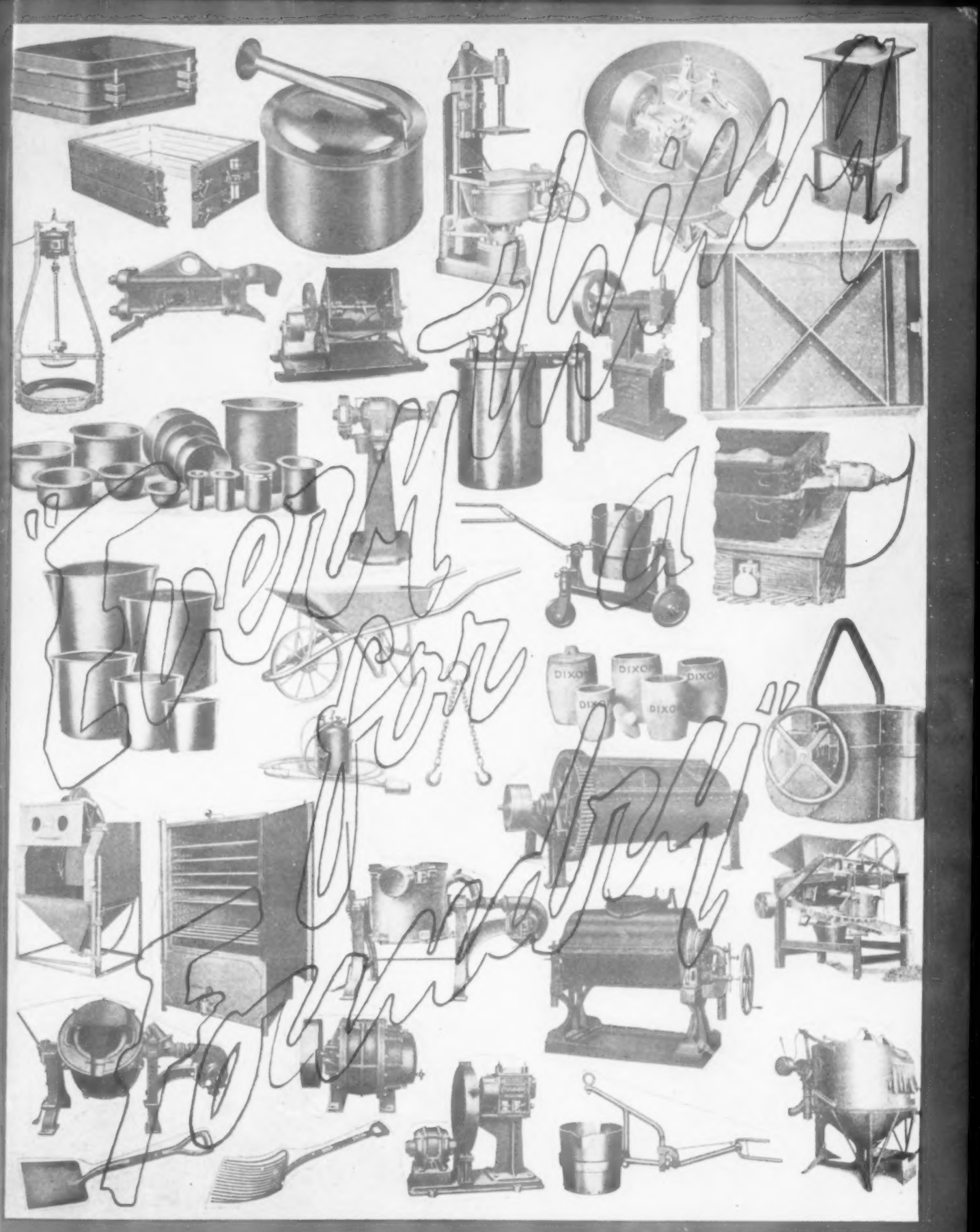


MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WIS.—DEPT. 202

Cupolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles • Improved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems For Metal & Mold Handling • Furnace Charging Cranes • Electric Cranes

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.



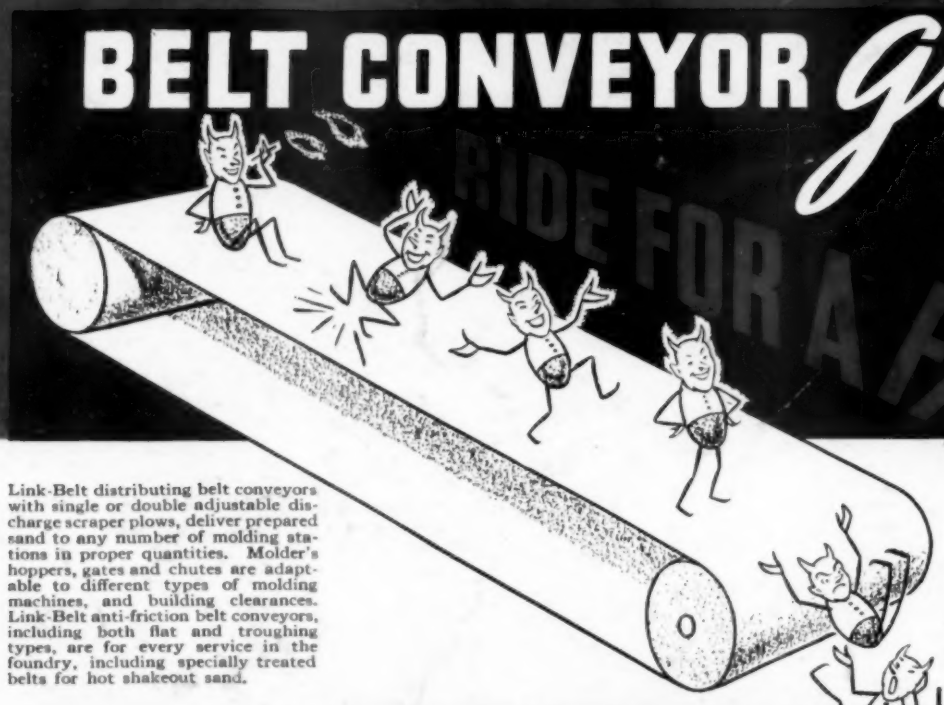
FREDERIC B. STEVENS INCORPORATED

DETROIT 26 MICHIGAN

NEW ENGLAND . . . . . 166-182 Brewery St., New Haven, Conn.
NEW YORK and PENNSYLVANIA . . . . . 93 Stone St., Buffalo, N. Y.
INDIANA . . . . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind.

• CANADA . . . . FREDERIC B. STEVENS OF CANADA, LIMITED
• 1262 McDougall St. . . . . Windsor, Ontario
• 2368 Dundas St. West . . . . . Toronto, Ontario

BELT CONVEYOR *Gremlins*



Link-Belt distributing belt conveyors with single or double adjustable discharge scraper plows, deliver prepared sand to any number of molding stations in proper quantities. Molder's hoppers, gates and chutes are adaptable to different types of molding machines, and building clearances. Link-Belt anti-friction belt conveyors, including both flat and troughing types, are for every service in the foundry, including specially treated belts for hot shakeout sand.

WHEN YOU DO THESE SIX THINGS:

1. KEEP INSTALLATION CLEAN

Make periodic inspections daily to see that there is no accumulation of material that has spilled off the belt.

2. USE IMPACT IDLERS . . .

Rubber-tread impact idlers at loading and transfer points will prolong belt life by preventing cutting and bruising.

3. "TRAIN" THE BELT . . .

For efficient operation, keep both the carrying and return runs of a conveyor belt practically centered on the supporting idlers.

4. MAINTAIN THE "TRAINING"

Maintaining the "training" of the belt on the conveyor is assured at all times if self-aligning idlers are used.

5. MAINTAIN BELT TENSION

Proper belt tension eliminates excessive belt sag between idler rolls and prevents unnecessary wear.

6. LUBRICATE PROPERLY . . .

Never over-lubricate idler rolls and other moving parts, for too much lubrication is as bad as too little.

GREMLIN CHASERS: Inspect equipment regularly—and make replacements with genuine Link-Belt parts when necessary. Link-Belt manufactures a complete line of idlers, pulleys, bearings, take-ups, drives, trippers, etc., built for every service.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY

Chicago, Indianapolis, Philadelphia, Pittsburgh, Wilkes-Barre, Huntington, W. Va., Denver, Kansas City, Mo., Cleveland, Detroit, St. Louis, Seattle, Toronto, Vancouver. 9201D